Integrated Land Use & Transport Study – Maitland City Wide

URaP
Urban Research & Planning

MAITLAND INTEGRATED LAND USE & TRANSPORT STUDY

MAITLAND LOCAL GOVERNMENT AREA - PART 1

November 2008

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1.0 INTRODUCTION

1.1 Background

The Maitland Local Government Area (LGA) is located in the Lower Hunter Valley adjoining the Councils of Newcastle, Lake Macquarie, Cessnock, Singleton, Dungog and Port Stephens.

The LGA has an area of 392 square kilometres and a population of 61,115 (ABS, 2006). The city is currently experiencing population and development growth of over 2.0% per annum which is well above the annual state average.

By 2020, local population is expected to be 75,000 persons (based on 1.5% pa growth) to 92,500 persons (based on 3.0% pa growth) as forecasted in the Maitland Urban Settlement Strategy (MUSS). This equates to an additional 15,500 persons to 31,000 persons over the period 2006–20. As a consequence the planning and provision of infrastructure and sustainable urban development are key focus areas for Council. Planning is underway for local road infrastructure - in the east and west sectors of the city - for future urban settlements.

Accordingly, in April 2007, Council commissioned an integrated land use and transport study (ILUTS) for Maitland LGA in order to establish the capacity of the route system to accommodate the expected population growth with consideration to land use planning for the area.

1.2 Study Process

The study process has included the following activities:

Stage 1

- Investigation and review of overall land use and transport aspects of the study area.
- Site analysis of the area including land use, vehicular, cycle way and pedestrian route network.
- Literature review including governmental strategies and reports on proposed developments and land release areas.
- Workshop (i.e. technical consultation) to canvass information and exchange ideas between Council's staff and study team.

Stage 2

- Evaluation of comments from the workshop.
- Assessment of the existing and future major development sites within the study area.
- Assessment of land use and transport situation for the area with respect to its future growth
- Development of a traffic model for the study area
- Analyses of options for preparation of a route network strategy.
- Technical workshop to ensure that Council's staff are informed on findings of the study and that they have an important role in the decision making of options and trade-offs.

Stage 3

- Development of a route network strategy for the area.
- Development of traffic models for the year 2006 and 2026 for a "do nothing" scenario and optional scenarios.
- An overview of urban development strategy with respect to MUSS
- Development of a policy and action program for the study area with consideration to traffic and transport elements and MUSS.

1.3 Scope of the Report

The Study contains two core components:

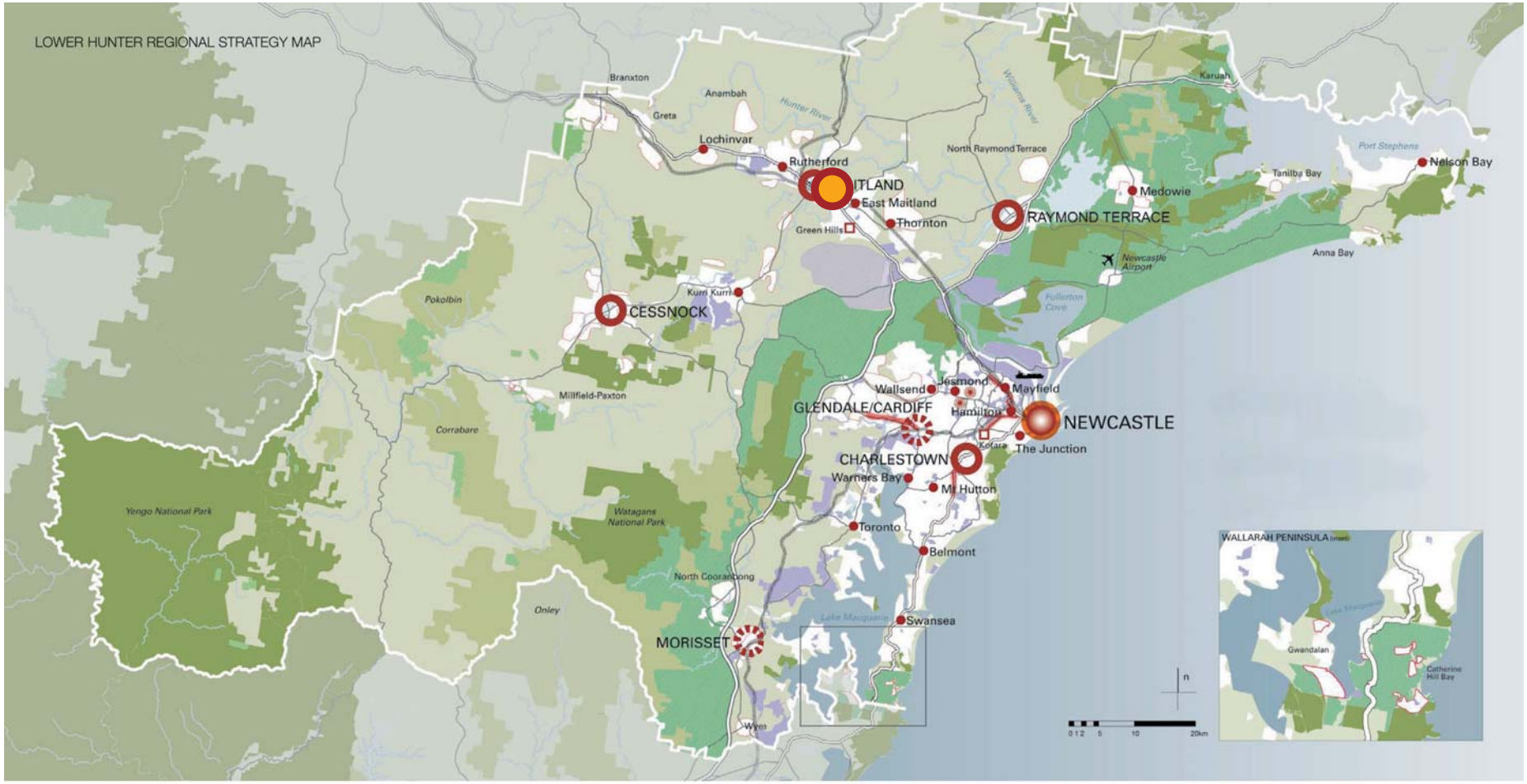
- Part 1 - City Wide Study – an overall study for the entire LGA; and
- Part 2 - CBD Study – a study focusing on Maitland CBD.

This report contains Part 1 of the Study which has a strategic nature and encompasses the whole LGA. One of the main objectives of this report is to identify how land use and transport in the Maitland area can be integrated to improve access to housing, jobs and services, which promote opportunities for public transport, walking and cycling, in keeping with projected growth throughout the city, for the short-term, medium term and long-term.

This report is divided into six sections:

Section 1: covers the introduction.
Section 2: provides an overview of current relevant strategies/projects.
Section 3: details the study area and its characteristics.
Section 4: assesses the road network and the proposed measures.
Section 5: develops access plans for the area.
Section 6: recommends policies and actions.

FIGURE 1.1 - LOWER HUNTER AREA



EXISTING URBAN AREA

PROPOSED URBAN AREA
Boundaries to be defined through local planning

NATIONAL PARK (EXISTING AND FUTURE)

STATE FOREST

RURAL AND RESOURCE LAND
Agriculture, drinking water aquifers, mineral and timber resources will be protected. Land that provides valuable economic, environmental and social benefits to the region.

EMPLOYMENT LAND
Contain various employment activities such as: factories, warehouses, manufacturing, or major storage operations with some associated offices.

RENEWAL CORRIDOR
Residential and mixed use opportunities for areas around high frequency transport networks and in close proximity to centres.

NEWCASTLE REGIONAL CITY
Main focus for business, professional services, specialised shops and tourism. It is also a recreation and entertainment destination for the region.

MAJOR REGIONAL CENTRE
Major shopping and business centre for the district, usually with council offices and central community facilities.

EMERGING MAJOR REGIONAL CENTRE
Centres that are expected to grow and take on the role of major centres in the future.

PROPOSED EMPLOYMENT LAND

FUTURE FREIGHT HUB & EMPLOYMENT LANDS
Identified as providing an opportunity for the storage, transfer and distribution of containerised freight and associated employment.

WATAGAN STOCKTON & WALLARAH GREEN CORRIDORS
Areas of high conservation values joining key corridors through the region. Lands within the corridor will be managed for conservation purposes.

PROPOSED CONSERVATION LANDS (DEDICATIONS)
Areas of high conservation values outside green corridors that will be dedicated to the Government.

SPECIALISED CENTRE
Centres including John Hunter Hospital, Newcastle University, the Port and Newcastle Airport that perform vital economic and employment roles within the region.

TOWN
Shopping and business centre for the district including health and professional services mixed with medium and higher density residential.

NEWCASTLE AIRPORT

PORT

STAND ALONE SHOPPING CENTRE
Privately owned centres located away from other commercial areas, containing many of the attributes of a town but without housing or public open space.

Source: NSW Department of Planning

Some Transport Issues in Maitland

- Population and development growth is above state average in Maitland.
- Long peak traffic: approx. 6.30am mines traffic, then approx. 7.30am local and regional business traffic.
- Freight traffic: majority of freight movements on Pacific Highway and minority of freight movements on New England Highway.
- Traffic congestion of Maitland - Newcastle Road corridor.
- Traffic congestion at roundabouts on New England Highway near Maitland Station and Maitland Hospital.
- Traffic impacts on East Maitland associated with third Hunter River crossing.
- Reviewing traffic access and circulation in Maitland CBD.
- Metford TAFE requires high standard bus transport service.
- Regional road infrastructure projects: Pacific Highway Upgrade and the Hunter Expressway.
- No access to rail transport in the Aberglasslyn and Rutherford areas.
- Future demand for use of Lochinvar railway station following development of Lochinvar urban release area.
- No rail transport to Cessnock.
- Victoria Street railway station and East Maitland railway station are not to current accessibility standards.
- Disconnected freight routes to commercial centres and industrial areas in Maitland LGA.
- Low patronage on public transport and excessive use of car transport.
- Cycleways are planned however, funding not supported by State and Federal governments.
- Pedestrian access limited by development densities and location too far from transport hubs.
- Determining the planning principles relevant to integrated land use and transport.
- Transport choice determined by appropriate land use policy.
- Defined locations for connectivity between different transport modes.

1.4 Study Area

The study area comprises the Maitland LGA. In addition there are specific core study areas that include:

- Urban centres and transport corridors,
- Investigation areas as defined in the Maitland Urban Settlement Strategy,
- Major traffic generating developments,
- Maitland Central Business District

Maitland City is located in the Hunter Region of New South Wales, about 170 kilometres north of Sydney. Maitland City is bounded by Dungog Shire in the north, the Port Stephens Council area in the east, the City of Newcastle and Cessnock City in the south and the Singleton Council area in the west.

Maitland City includes the towns and localities of Aberglasslyn, Allandale (part), Anambah, Ashtonfield, Berry Park, Bishops Bridge (part), Bolwarra, Bolwarra Heights, Chisholm, Cliftleigh, Duckenfield, East Maitland, Farley, Gillieston Heights, Gosforth, Greenhills, Greta (part), Harpers Hill, Hillsborough, Horseshoe Bend, Lambs Valley, Largs, Lochinvar, Lorn, Louth Park, Luskintyre, Maitland, Maitland Vale, Melville, Metford, Millers Forest, Mindaribba, Morpeth, Mount Dee, Oakhampton, Oakhampton Heights, Oswald, Phoenix Park, Pitnacree, Raworth, Rosebrook, Rutherford, South Maitland, Telarah, Tenambit, Thornton, Tocal, Windella, Windermere, Woodberry and Woodville.

FIGURE 1.2 - LOCAL GOVERNMENT AREA - STUDY AREA

2.0 PLANNING CONTEXT

2.1 Land Use and Transport

The Maitland Local Environmental Plan (LEP) 1993 sets out objectives and controls for the development of land in the Maitland local government area. The main aim of the plan is to encourage ecologically sustainable development.

The Plan zones land within the City for different purposes: generally residential, commercial, industrial, special uses, environmental protection and recreation.

Each zone indicates development, which is permissible with or without consent, and that which is prohibited. Special controls and provisions such as subdivision of land, minimum allotment size, height limits, floor space ratios, heritage and flooding are also outlined.

As part of the planning process Council is required to review its environmental planning instrument to align with the Standard Instrument within the next five years. As part of this process, Council is required to consider the Environment Planning and Assessment Act Section 117 Local Planning Directions. Inconsistencies with these directions can only be justified through adopted strategies or environmental studies. The Maitland ILUTS will form part of a suite of studies to inform the plan-making process for the new LEP and provide the necessary justification for adopted directions.

Section 117 Direction 3.4: Integrating Land Use & Transport

The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:

(a) improving access to housing, jobs and services by walking, cycling and public transport, and

(b) increasing the choice of available transport and reducing dependence on cars, and

(c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and

(d) supporting the efficient and viable operation of public transport services, and

(e) providing for the efficient movement of freight.

This direction requires Councils to locate zones for urban purposes and include provisions that give effect to, and are consistent with, State Policy entitled:

(a) Improving Transport Choice – Guidelines for planning and development (DUAP, 2001); and

(b) The Right Place for Business and Services – Planning Policy (DUAP, 2001).

Improving Transport Choice

Achieving sustainability in transport requires us to look differently at travel. We need to focus on:

- The movement of people and of goods, rather than the movement of vehicles, and
- Maximising **accessibility** (the ability to undertake a range of daily activities with a minimum of travel), rather than **mobility** (the ability to move freely).

This raises the challenge not only to make better transport and land use planning decisions, but also to better integrate these decisions for sustainable outcomes.

The Policy is based on ten (10) 'accessible development principles':

1. Concentrate in centres
2. Mix uses in centres
3. Align centres within corridors
4. Link public transport with land use strategies
5. Connect streets
6. Improve pedestrian access
7. Improve cycle access
8. Manage parking supply
9. Improve road management
10. Implement good urban design

The Right Place for Business and Services

This policy aims to moderate the unsustainable growth in car travel and travel demand patterns by encouraging the location of appropriate trip-generating development in centres.

Objectives

- Locate trip-generating development which provides important services in places that:
  - Help reduce reliance on cars and moderate the demand for car travel
  - Encourage people to travel on public transport, walk or cycle
  - Provide people with equitable and efficient access
- Minimise dispersed trip-generating development that can only be accessed by cars
- Ensure that a network of viable, mixed use centres closely aligned with the public transport system accommodates and creates opportunities for business growth and service delivery
- Protect and maximise community investment in centres, and ensure that they are well designed, managed and maintained
- Foster growth, competition, innovation and investment confidence in centres, especially in the retail and entertainment sectors, through consistent and responsive decision making.

The Right Location

The Policy states that the "objectives can be most effectively achieved by locating trip-generating development in and adjoining accessible mixed use centres." Where this is not possible due to the existing urban structure, redevelopment opportunities or local circumstances, the Policy states that alternatives may be acceptable when a net community benefit can be clearly established. A set of criteria is outlined in the Policy. The Policy clearly states that:

Any proposal to rezone land for trip-generating businesses or services should conform to a local strategy which incorporates the policy objectives. A relevant draft LEP should only be submitted to the Department of Planning with a strategic justification in terms of the policy and the net community benefit assessment criteria.

The Right Centre

Successful centres contain different activities, are accessible by public transport, walking and cycling, and are supported by government, business and the community. The size, status and functions of a centre should ideally correspond to its level of accessibility by various means of transport and its level of community investment.

Planning successful centres

To be successful, the Policy states that a centre should contain some of these elements (depending on its size, status and function):

- ***Diverse uses*** *that help maintain economic activity and viability, and extend centre use into the evening and weekends*
- ***Employment opportunities*** *maximising the use of public transport and convenience for workers and visitors*
- ***Attractive, lively, safe and secure places*** *with an active, accessible public area*
- ***Transport infrastructure and management*** *that prioritise pedestrian movement and public transport access*
- ***Flexibility to adapt to changing community and commercial needs*** *to remain places of personal and business opportunity*
- ***A recognisable character and a focus for interaction*** *valued by the community and businesses.*

State Environmental Planning Policy (SEPP) 66

The Draft State Environmental Planning Policy (SEPP) 66 also encourages more equitable access to jobs and services by proactive land use planning by reducing the need for car trips and promoting opportunities for walking, cycling and public transport.

This Policy aims to ensure that urban structure, building forms, landuse locations, development designs, subdivision and street layouts help achieve the following planning objectives:

(a) improving accessibility to housing, employment and services by walking, cycling, and public transport,

(b) improving the choice of transport and reducing dependence solely on cars for travel purposes,

(c) moderating growth in the demand for travel and the distances travelled, especially by car,

(d) supporting the efficient and viable operation of public transport services,

(e) providing for the efficient movement of freight.

2.2 Strategies

There are a number of strategy documents that provide directions and information on future planning for the Maitland LGA. A brief summary of the main documents are described below.

Maitland Urban Settlement Strategy (MUSS)

The Maitland Urban Settlement Strategy provides the broad direction for future urban growth in the Maitland LGA. The Strategy aims to provide both flexibility and certainty by maintaining a generous supply of land for residential growth on a number of development fronts throughout the Maitland LGA, without rezoning too much land ahead of market demand.

In summary, this Strategy makes provision for on-going population growth over the next 15 – 25 years. A range of different housing types and locations are proposed in the Strategy.

The strategy suggests a medium growth rate of 2.5% pa for the Maitland LGA, with a high projection of 3.0% pa growth and a low projection of 1.5% pa growth.

Table 2.1 details the difference between high, medium and low growth rates and the potential impact on annual dwelling construction rates and the population of the Maitland LGA if these rates are sustained.

Table 2.1: Population projections for Maitland LGA: 2020

	Estimated dwelling constructions	Estimated population 2020
Low growth 1.5% pa	400 / year	75,000
Medium growth 2.5% pa	720 / year	86,200
High growth 3.0% pa	900 / year	92,500

In summary, this Strategy provides for a range of urban and employment land uses, in a staged manner considering the short and long-term development demands. A variety of housing types are catered for, including large lifestyle lots and affordable small lot housing.

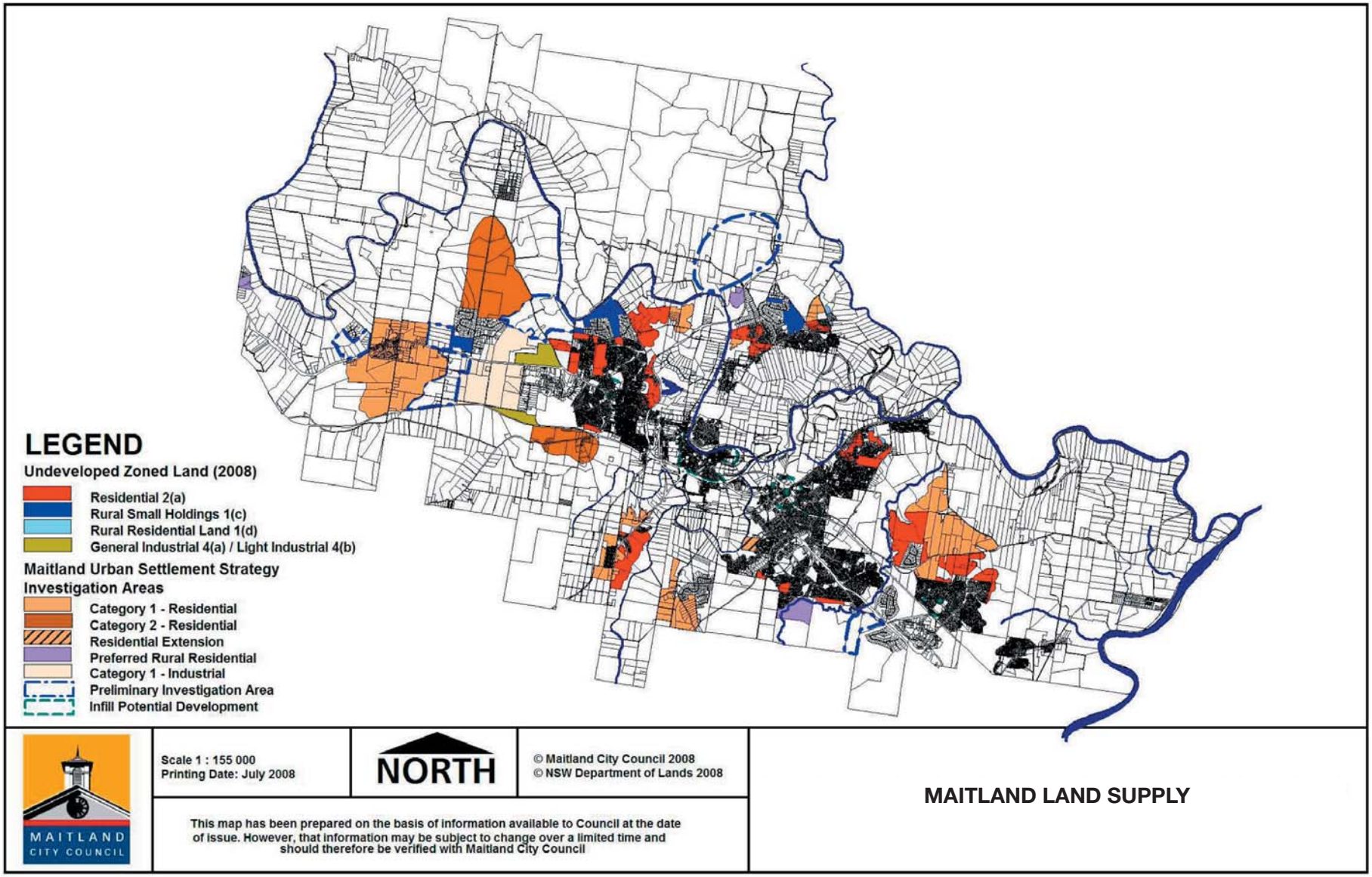
Table 2.2: Urban land supply to 2020

Infill development	3,000 dwellings
Category 1 Residential	7,400 dwellings
Category 2 Residential	6,800 dwellings
Rural Residential areas	440 dwellings
TOTAL	**17,640 dwellings**

Table 2.3: Residential land sequencing

Land release	Location
Short-term (0–5 years)	Thornton North (Cat 1) Gillieston Heights (Cat 1) Aberglasslyn West Rutherford Largs Bolwarra
Medium term (5–10 years)	Thornton North (Cat 2) Gillieston Heights (Cat 2) Farley
Long term (10+ years)	Anambah Maitland Vale
Deferred area	Lochinvar

FIGURE 2.1 - SUMMARY OF INVESTIGATION AREAS AS SHOWN IN MUSS



Lower Hunter Strategy

The Draft Lower Hunter Regional Strategy applies to the five Lower Hunter Councils of Cessnock, Lake Macquarie, Newcastle, Port Stephens and Maitland. It is one of a number of regional strategies prepared by the Department of Planning to complement the Metropolitan Strategy. The Draft Strategy identifies key population centres and major new release areas, with an objective to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing, employment and environmental needs of the Region's population over the next 25 years (i.e. 2006-2031).

Released in November 2005, the Draft Strategy is based on a population scenario which forecasts a population growth for the Lower Hunter of 160,000 additional people by 2031 (with some 115,000 new dwellings and 66,000 new jobs). Centres and identified greenfield release areas have been nominated as the key focus areas for housing demand. A higher proportion of new housing is proposed in centres and with new release areas building on existing communities. These two objectives are planned to reduce the pressure on existing established suburbs, maintaining the character and preserving detached dwellings, but also containing the expansion of new urban areas and the pressure for additional infrastructure.

The Draft Strategy identifies Central Maitland as one of four major centres in the Lower Hunter, with potential for increased densities in and around the CBD centre and a dominant role in the commercial hierarchy. In the Maitland LGA, greenfield urban release areas have been proposed at Lochinvar, Thornton North, Gillieston Heights, Aberglasslyn and West Rutherford. This is consistent with Council's strategic planning policies and investigations.

Table 2.4: Dwelling capacity projections

	Centres and corridors	Urban infill	Total infill	New release	Total dwellings
Cessnock	500	1500	2000	19,700	21,700
Maitland	2,000	3,000	5,000	21,500	26,500
Port Stephens	3,300	2,000	5,300	7,200	12,500
Newcastle	12,200	2,500	14,700	5,800	20,500
Lake Macquarie	14,000	7,000	21,000	15,000	36,000
TOTAL	**32,000**	**16,000**	**48,000**	**69,200**	**117,200**

Note: The numbers in Table 2.4 provide a small excess of dwellings so that a contingency exists if dwelling yields are not able to be met. These projections will be continually reviewed and monitored as part of the Urban Development Program.

Maitland Rural Strategy

The long-term vision for Maitland's rural areas is to provide a land use planning and management framework to guide future decisions about the use of the City's rural lands. The Strategy is specifically concerned with maintaining the economic viability of agriculture and protecting the natural, ecological and scenic quality of the rural environment.

The study area for the Strategy is restricted to the rural land outside the urban precincts (including industrial and commercial areas) of the Maitland LGA. Rural land is best described as land not used for urban purposes and may encompass land used for agricultural production; rural tourism and industrial operations; mining, forestry and extractive industries; rural living; and, conservation of natural systems such as rivers, wetlands and native vegetation.

A total of 3,142 lots within the rural areas were counted in the survey and the overall land use pattern is shown in Table 2.5. It can be seen that the largest land use (in terms of number of lots) is Rural Residential with approximately 28%.

Table 2.5: Maitland Rural Land Use

Land Use	Number of Lots	% Total
Rural residential	883	28.1
Extensive	752	23.9
Intensive plants	694	22.1
Vacant	573	18.2
Public use	100	3.2
Commercial	51	1.6
Extractive industry	43	1.4
Intensive animals	38	1.2
Native vegetation	6	0.2
Wetland	2	0.
TOTAL	**3,142**	**100**

Sustainable Transport in the Lower Hunter Region

The report Sustainable Transport in the Lower Hunter Region (Transit Planners 2003) provides a review of transport issues with consideration to the Lower Hunter area (comprising five councils: Newcastle, Lake Macquarie, Maitland, Cessnock and Port Stephens).

The document states that *"under current trends, the car will remain the dominant means of personal transport, although its form, energy source and even guidance systems may change in the future.* ***The task is to encourage sufficient people to review their travel behaviour for at least some of their trips so that the growth in vkt is brought under control.*** *A realistic target of converting 20% of trips to alternative modes means that 80% of current car trips may remain mostly unaltered."*

The report suggests a number of overall strategies for the area including the following related to Maitland:

- Improve the accessibility of the bus services at both the City Centre and Green Hills
- Introduce a high-frequency direct bus service between City Centre and Green Hills during shopping hours, integrated with train services
- In the longer term, extend the Lower Hunter Sustainable Transport System to include City Centre and Green Hills.

The report also identifies that "the most fundamental starting point for sustainable transport in the Lower Hunter is a Regional Sustainable Transport Plan. This Plan would adopt a comprehensive approach to sustainable transport, and would include a number of Strategies, such as:

- Integrated Transport Management Strategy
- Roads Management Strategy
- Freight Transport Strategy
- Public Transport Strategy
- Innovative Transport Strategy
- Travel Behaviour Change Strategy
- Pathways Strategy (including cycleways).

Lower Hunter Transport Needs Study (LHTNS)

In July 2008 the Australian and New South Wales Governments have jointly committed funds for a comprehensive study into the transport needs of the Lower Hunter Region. The study area includes the local government areas of Maitland, Cessnock and Singleton and connections to Newcastle and the F3. The Department of Infrastructure, Transport, Regional Development and Local Government (Department of Infrastructure) and the RTA were requested to conduct a study, using an independent consultant, into the appropriateness of existing land transport networks in meeting the short and long term transport needs of the Lower Hunter. The Study aimed to identify potential transport proposals capable of being delivered in the short term, as well as a series of strategic initiatives to meet the identified transport needs over the longer term. It was envisaged that the study would identify and assess options to enhance transport connections linking Maitland, Cessnock and Singleton with Newcastle and the F3 to support state and national economic growth.

The Study (Hyder, 2009) completed in April 2009 and its main finding involves the need for a new or upgraded road corridor running east/west from the F3 Freeway to the New England Highway at Branxton. The study recommends a new road through the study area from the New England Highway (SH9) west of Branxton to the F3 Freeway. This would serve the through traffic between the F3 Freeway, the port and city of Newcastle and the inland component of the Sydney – Brisbane Strategic Corridor (New England Highway). The Study states that this measure will reduce traffic to an acceptable level within Maitland and Cessnock and other nearby townships; and will integrate the dispersed towns of the study area into the Newcastle metropolitan region, assisting the Lower Hunter area to function as a whole.

The LHTNS also recommends the following:

- The Maitland to Newcastle passenger rail service is an essential part of the region's transport system and is proposed to be a re-badged 'Maitland Transit Shuttle (MTS)' rail service. As population grows additional capacity will be required with longer trains operating at higher frequencies for much of the day. This service will also require a new interchange in Newcastle with well coordinated bus services to the main attractors within the city.
- Interchanges at MTS rail stations and road improvements for access to them will be required. A major interchange will be required at Maitland. Improvements will be required for walk and cycle access, for bus lanes, for parking and good pedestrian paths including impaired mobility within the interchanges.
- Improved local transport capability within the towns in the study area can be met by improved local bus services and by better networks of paths for cycling and walking within each town. The congestion on New England Highway (SH9) through Maitland and suburbs has an adverse effect on the reliability of local bus services and on many walk and cycle trips. Removal of this congestion will allow improved local travel and amenity.

The freight strategy should involve:

- Corridor preservation for future transport infrastructure;
- Staged highway construction to provide relief along the urbanised sections of the New England Highway (SH9);
- ARTC to maintain the priority for coal train paths while preserving train paths to serve passengers and other freight needs; and
- A freight corridor separate from the existing New England Highway would be most beneficial for truck efficiency. Freight hauliers, industry broadly and the region's communities would benefit from a new arterial road because it would separate heavy freight vehicles from the urban sections of New England Highway and MR220 through Maitland and Cessnock respectively and the smaller towns.

2.3 Summary

The Lower Hunter Strategy projects some 26,500 additional dwellings within the Maitland LGA by the year 2031. This equates to some 50,000 to 60,000 additional residents within the LGA, leading to a total population of over 110,000 by the year 2031. The MUSS also predicts a population of 75,000 to 92,500 by the year 2020 for the LGA.

For the purpose of this study and considering the level of projected growth within the Lower Hunter area, an ultimate population of 92,500 has been considered for the Maitland LGA by the year 2026 ie. based on MUSS population projection however, over a longer duration.

Accordingly, appropriate assumptions are made on this basis to assess the infrastructure and planning requirements. These reflect potential residential and employment lands within the LGA and their relevant activities.

3.0 SITE ANALYSIS

3.1 Area Characteristics

Maitland, located 163 km north of Sydney and 32 km north-west of Newcastle, is situated just 10m above sea-level on flood plains adjacent the Hunter River.

Consequently it has been subject to some major floods during the era of European settlement (the first being recorded in 1819).

The original inhabitants of the Maitland area were the Worimi and Awabakal Aboriginal people. The Gringgai clan of the Wanaruah Aboriginal people occupied the area prior to white settlement, calling it Boe-oon after a species of waterfowl.

Lieutenant-Colonel Paterson of the NSW Corps explored the Hunter in 1801 and named the site of the future town Schanck's Forest Plains. Cedar-getters soon followed, calling it 'The Camp'. Permanent European settlement commenced when Governor Macquarie opened the Lower Hunter up in the years 1818 to 1821[1].

European settlement dates from the early 1800s, following the arrival of cedar getters and the establishment of a port at Morpeth. The planned township of East Maitland was established in the 1830s, with West Maitland developing as a commercial centre. Land was used mainly for farming and mineral mining. Some growth took place in the late 1800s, following the construction of the railway line to Sydney in 1857 and the establishment of coal mining. Growth continued in the early 1900s, aided by the arrival of many Chinese market gardeners. The most significant development occurred in the post-war years, with the population increasing from about 19,000 in 1947 to 45,000 in 1986.

Maitland was once the principal town of the Hunter Valley and, given its early beginnings, has many historic buildings and features of considerable quality and cultural significance.

The Maitland Local Government Area (LGA) covers an area of 396 km^2 in the Lower Hunter region of New South Wales, as shown in Figure 1 Regional Location of Maitland LGA.

The Maitland area has long been recognised as being rich in natural resources such as coal, agricultural land (particularly for dairy cattle use) and other mineral deposits and metals.

The flood prone nature of much of the Maitland LGA has led to a distinctive, dispersed urban development pattern. The City's urban areas have a strong geographical presence due to their visibility to and from surrounding areas and many have the benefit of panoramic rural views. The result of this geographical setting is a large number of urban areas, each with their own idiosyncratic character and identity which, collectively, form the City of Maitland within an overall rural landscape of very high quality. This special character and identity must be carefully considered in planning for the future.

The Maitland LGA is located on the perimeter of Australia's largest urban conurbation, comprising Newcastle, Sydney and the Illawarra, and is located in close proximity to major transport links and the coastal and recreational areas of the Hunter. In addition, Maitland has substantial areas which are likely to be suitable for greenfield urban expansion and the City therefore boasts a range of strategic opportunities for the future.

[1] Sydney Morning Herald (17/2/2005)

Table 3.1: Summary Statistics – Maitland City

Enumerated data	2006			2001		
	Number	%	Hunter Councils Region %	Number	%	Hunter Councils Region %
Enumerated population, including overseas visitors						
Total population (a)	61,219	100.0	100.0	53,803	100.0	100.0
Males (a)	29,841	48.7	49.1	26,388	49.0	49.2
Females (a)	31,378	51.3	50.9	27.415	51.0	50.8
Overseas visitors	103	0.2	0.4	85	0.2	0.4
Enumerated population, excluding overseas visitors						
Total population (b)	61,115	100.0	100.0	53,718	100.0	100.0
Males (b)	29,792	48.7	49.2	26,353	49.1	49.2
Females (b)	31,323	51.3	50.8	27,365	50.9	50.8
Population characteristics						
Indigenous population	1,637	2.7	2.7	1,217	2.3	2.3
Australian born	53,528	87.6	85.2	47,741	88.9	86.0
Overseas born	4,279	7.0	9.1	3,652	6.8	9.0
Australian citizens	46,592	92.6	91.7	50,831	94.6	92.8
Australian citizens aged 18+	41,056	67.2	69.5	36,334	67.6	69.3
Institutional population	883	1.4	2.7	878	1.6	2.6
Age structure						
Infants 0 to 4 years	4,603	7.5	6.2	4,156	7.7	6.5
Children 5 to 17 years	12,344	20.2	18.0	11,331	21.1	18.8
Adults 18 to 64 years	37,033	60.6	59.7	32,241	60.0	59.4
Senior citizens 85 years and over	812	1.3	1.9	619	1.2	1.6
Households and dwellings						
Owned	7,088	29.6	32.8	7,721	37.4	39.2
Purchasing	8,529	35.7	27.4	5,954	28.8	22.5
Renting	5,625	23.5	22.9	4,922	23.8	22.3
Households (occupied private dwellings)	22,511	-	-	19,475	-	-
Persons counted in households	60,338	-	-	52,925	-	-
Average household size (persons)	2.68	-	-	2.72	-	-
TOTAL DWELLINGS	**23,906**	**100.0**	**100.0**	**20,639**	**100.0**	**100.0**

Source: Australian Bureau of Statistics, Census of Population and Housing, 2006, 2001, 1996 and 1991.

Table 3.1 shows a summary of Maitland LGA population characteristics. The demographical analyses are detailed in Section 3.8 of this report.

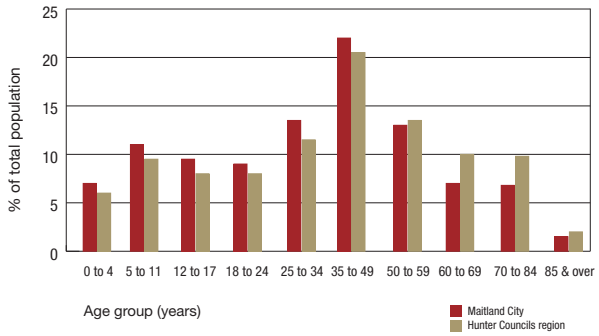
3.2 Demographics

Major features of the City include the Hunter River, Maitland City Centre, Green Hills Shopping Centre, Maitland Gaol, Maitland Airport (Rutherford), Maitland Golf Course, Westside Golf Course, Maitland Hospital, Walka Water Works Picnic Reserve, Don Macindoe Memorial Flying Field and various wineries. The City is served by the New England Highway and the Hunter railway line.

The population of Maitland has increased by 22.6% (or 11,268 people) over 10 years from 49,847 in 1996 to 61,115 in 2006. About 47% of population are aged between 25 to 59 years old while almost 28% are under 17 years of age.

The key statistics data are shown in Table 3.1 providing a comparison between Maitland City and Hunter Region Councils (i.e. Newcastle, Lake Macquarie, Maitland, Port Stephens, Cessnock, Singleton and Muswellbrook).

Age structure of Maitland City and Hunter Councils Region, 2006 (Enumerated data)



Source: Australian Bureau of Statistics 2006 Census Population and Housing (Enumerated)

The document Maitland Community Profile for 2006 provides results from the 2006 and 2001 Censuses of Population and Housing. Some of the relevant points from this document are highlighted below:

- The largest changes in age structure in this area between 2001 and 2006 were in the age groups:
  - 0 to 59 (+1,481 persons);
  - 60 to 69 (+1,137 persons);
  - 35 to 49 (+1,045 persons); and
  - 25 to 34 (+874 persons).

Housing

- In 2006, there were 20,011 households who occupied a separate house in the area, while 2,366 occupied a medium density dwelling, and 4 occupied high density flats and apartments.
- Maitland has shown a relatively high dwelling density with average household size of 2.7 persons per dwelling.

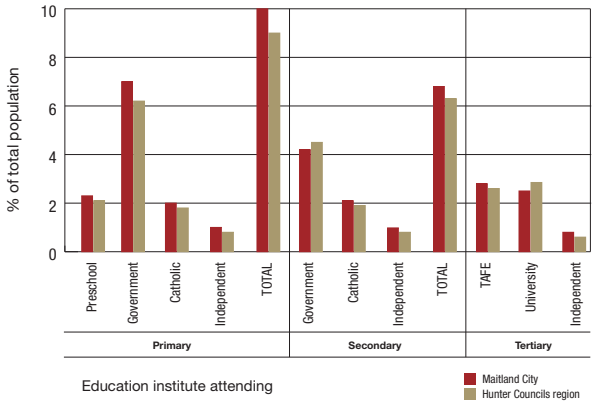
Education

- Analysis of the highest level of schooling attained by the population in Maitland City in 2006 compared to the Hunter Councils Region shows that there was a larger proportion of people who had left school at an early level (Year 10 or less) but a similar proportion of people who completed Year 12 or equivalent.
- Overall, 10.0% of the population were attending primary school, 7.1% of the population were attending secondary institutions, and 5.1% were learning at a tertiary level, compared with 8.8%, 6.6% and 5.3% respectively for the Hunter Councils Region.

Employment

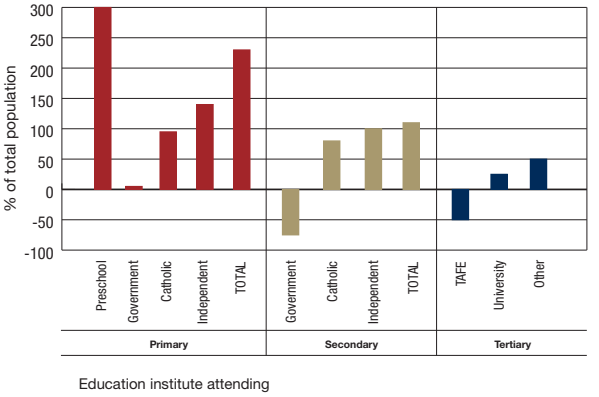
- The size of Maitland City's labour force in 2006 was 28,766 persons; of which 9,372 were employed part-time (32.6%) and 16,753 were full time workers (58.2%).
- Between 2001 and 2006 in Maitland City the number of people in the labour force showed an increase of 4,410 people, or 18.1%.
- An analysis of the jobs held by the resident population in Maitland City in 2006 shows the three most popular industry sectors were:
  - Retail Trade (3,455 persons or 12.9%)
  - Manufacturing (3,379 persons or 12.6%)
  - Health Care and Social Assistance (2,862 persons or 10.7%)
- An analysis of the occupations held by the resident population in Maitland City in 2006 shows the three most popular occupations were:
  - Technicians and Trades Workers (4,778 persons or 17.8%)
  - Professionals (4,124 persons or 15.4%)
  - Clerical and Administrative Workers (3,890 persons or 14.5%)

Education institute attending, Maitland City and Hunter Councils Region, 2006 (Enumerated data)



Source: Australian Bureau of Statistics 2006 Census of Population and Housing (Enumerated).

Change in education institute attending. Maitland City 2001 to 2006 (Enumerated data)



Source: Australian Bureau of Statistics, 2006 and 2001 Census of Population and Housing (Enumerated)

Table 3.2: Employment Status (persons aged 15 years and over) – Maitland City

Enumerated data	2006			2001			Change to 2001 to 2006
	Number	%	Hunter Councils Region %	Number	%	Hunter Councils Region %	
Employed full time	16,753	58.2	56.3	13,583	55.8	54.7	3,170
Employed part time	9,372	32.6	33.9	7,764	31.9	32.5	1,608
Employed - not stated	736	2.6	2.5	712	2.9	2.7	24
Total employed	26,861	93.4	92.8	22,059	90.6	90.0	4,802
Total unemployed	1,905	6.6	7.2	2,297	9.4	10.0	-392
Total labour force	28,766	100.0	100.0	24,356	100.0	100.0	4.410
Total in labour force	28,766	61.2	56.0	24.356	59.6	54.8	4,410
Total not in labour force	16,058	34.2	39.1	15,513	38.0	41.5	545
Not stated	2,148	4.6	5.0	987	2.4	3.8	1,161
TOTAL	**46,972**	**100.0**	**100.0**	**40,856**	**100.0**	**100.0**	**6,116**

Source: Australian Bureau of Statistics, Census of Population and Housing, 2006, 2001, 1996 and 1991.

TRAVEL

Analysis of the method of travel to work of the residents in Maitland City in 2006 compared to the Hunter Councils Region shows that 2.6% used public transport, while 75.7% used a private vehicle, compared with 2.1% and 73.4% respectively in the Hunter Councils Region.

The largest changes in the method of travel to work by resident population in Maitland City between 2001 and 2006 were:

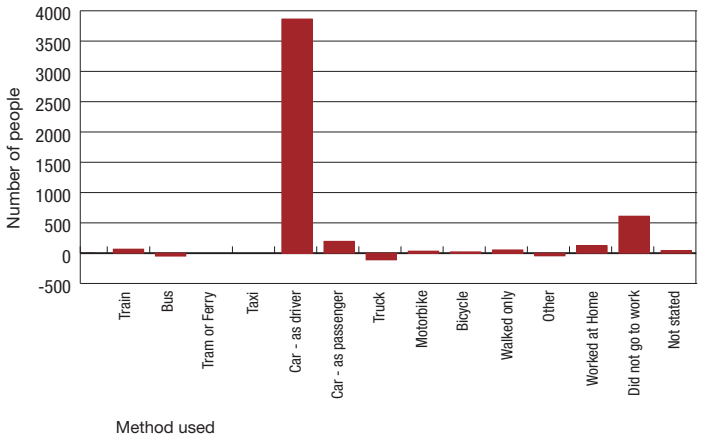
- Car - as driver (+3,864 persons);
- Did not go to work (+610 persons);
- Car - as passenger (+195 persons) and;
- Worked at home (+122 persons).

Table 3.3: Travel to work (includes multi-mode journeys) – Maitland City

Enumerated data	2006			2001			Change to 2001 to 2006
	Number	%	Hunter Councils Region %	Number	%	Hunter Councils Region %	
Train	587	2.2	0.9	52	2.4	1.0	66
Bus	102	0.4	1.2	150	0.7	1.4	-48
Tram or Ferry	6	0	0	9	0	0	-3
Taxi	33	0.1	0.1	33	0.1	0.2	0
Car - as driver	17,932	66.8	64.6	14,068	63.8	61.8	3,864
Car - as passenger	1,787	6.7	6.4	1,592	7.2	6.9	195
Truck	417	1.6	1.7	527	2.4	2.2	-110
Motorbike	168	0.6	0.7	135	0.6	0.7	33
Walked only	528	2.0	3.3	475	2.2	3.4	53
Other	223	0.8	1.0	267	1.2	1.4	-44
Worked at home	953	3.5	4.2	831	3.8	4.9	122
Did not go to work	3,567	13.3	13.1	2,957	13.4	13.4	610
Not stated	440	1.6	1.8	401	1.8	1.8	39
TOTAL	**26,861**	**100.0**	**100.0**	**22,063**	**100.0**	**100.0**	**4,798**

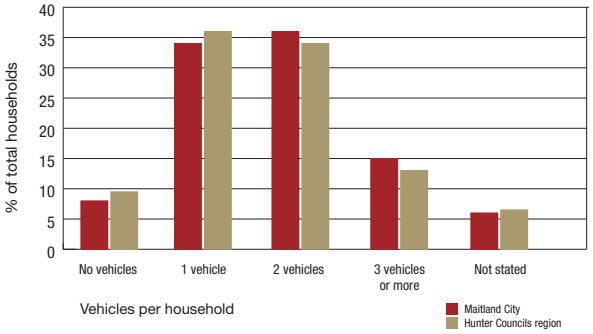
Source: Australian Bureau of Statistics, Census of Population and Housing, 2006, 2001, 1996 and 1991.

Change in mode of travel to work – Maitland City, 2001 to 2008 (Enumerated data)



Source: Australian Bureau of Statistics, 2006 and 2001 Census of Population and Housing (Enumerated)

Car ownership, Maitland City and Hunter Councils Region, 2006 (Enumerated data)



Change in car ownership, Maitland City, 2001 to 2006 (Enumerated data)

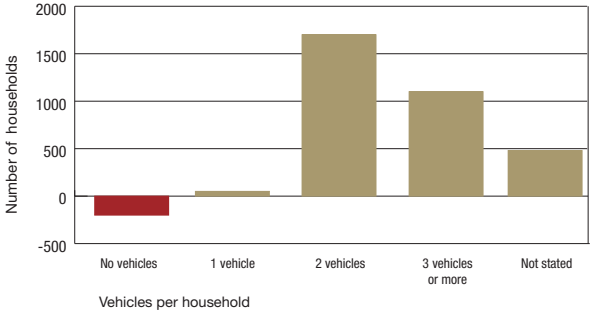


Table 3.4: Employment location of residents

Employment location of Maitland City's residents - 2006	Number	Percentage %
Within Maitland City	11,722	43.0
Outside Maitland City	13,391	49.1
Live within Maitland City, work location unknown	2,153	7.9
Employed residents of Maitland City	27,266	100.0

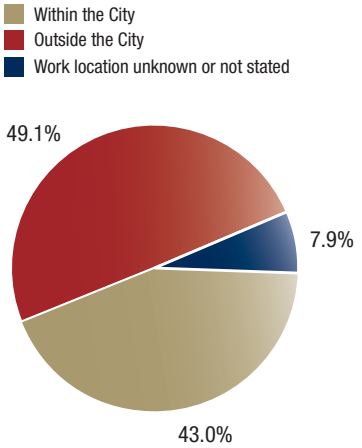


Table 3.5: Top 10 LGA Areas of Employment for Residents

Top 10 Local Government Areas of employment for residents in Maitland City - 2006			
Rank	Local Government Area	Number	Percentage (%)
1	Maitland (C)	11,722	43.0
2	Newcastle (C)	6,417	23.5
3	Port Stephens (A)	1,648	6.0
4	Cessnock (C)	1,441	5.3
5	Singleton (A)	1,325	4.9
6	Lake Macquarie (C)	1.267	4.6
7	Muswellbrook (A)	208	0.8
8	Dungog (A)	137	0.5
9	Wyong (A)	85	0.3
10	Gosford (C)	71	0.3
	Other areas	2,945	10.8
	Total employed residents in Maitland City	27,266	100.0

Source: Australian Bureau of Statistics, Journey to work, unpublished data, 2006.

Where do the workers come from?

Understanding where workers come from is important information for Local Government. It assists in planning and advocacy for roads and public transport provision. It also helps to clarify the economic and employment drivers across areas and assists in understanding the degree of employment self containment within a local government area. This data is a part of the 'journey to work' data set.

The journey to work data that is presented below is based on the 2006 Census Question: "For the main job held last week, what was the person's workplace address?"

This data is then cross-tabulated with the person's current usual residential address to create a matrix of home to work, with the focus of the analysis on the work destination. This information is generally not available at the small area (suburb/locality) level due to geographic limitations when being coded or processed.

- Maitland City has a workforce of some 27,266 with job availability of 19,887 within the LGA. This equates to a job/workforce ratio of 73%.
- About 43% of employed Maitland residents work within the LGA while 49% work outside the area.
- About 59% of jobs within the Maitland area are taken by its residents while 41% of jobs within the LGA are taken by residents outside the area.

Table 3.6: Residential location of workers

Residential[a] location of workers in Maitland City - 2006	Number	Percentage %
Live and work within Maitland City	11,722	58.9
Live outside, but work within Maitland City	8,165	41.1
Total workers in Maitland City	19,887	100.0

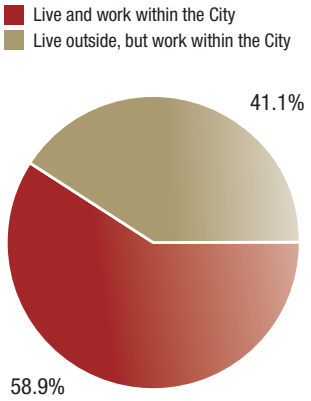


Table 3.7: Top 10 LGA Areas of Residence for Workers

Top 10 Local Government Areas of residence for workers in Maitland City - 2006			
Rank	Local Government Area	Number	Percentage (%)
1	Maitland (C)	11,722	58.9
2	Newcastle (C)	2,168	10.9
3	Cessnock (C)	1,698	8.5
4	Lake Macquarie (C)	1,606	8.1
5	Port Stephens (A)	1,391	7.0
6	Dungog (A)	450	2.3
7	Singleton (A)	290	1.5
8	Wyong (A)	151	0.8
9	Gosford (C)	75	0.4
10	Great Lakes (A)	67	0.3
	Other areas	269	1.4
	Total workers in Maitland City	19,887	100.0

Transport Data Centre

Table 3.8: Key Transport Indicators (a) by Statistical Local Area of Residence (SLA), 2005. Newcastle Statistical Sub-Division (SSD)

		Cessnock	Lake Macquarie	Maitland	Newcastle Inner	Newcastle Remainder	Port Stephens	TOTAL SSD
POPULATION (b)	Persons	48,000	188,000	61,000	6,000	137,000	63,000	503,000
	No. of households	18,000	71,000	22,000	3,000	58,000	24,000	196,000
	Average household size	2.7	2.7	2.8	1.9	2.4	2.6	2.6
TOTAL TRAVEL	Trips av. weekday	171,000	775,000	227,000	28,000	555,000	252,000	2,008,000
	Trips av. weekend day	169,000	585,000	220,000	27,000	456,000	217,000	1,675,000
	Trips per person - weekday	3.6	4.1	3.7	4.4	4.0	4.0	4.0
	Trips per person - weekend	3.6	3.1	3.6	4.2	3.3	3.5	3.3
	Trips per household -weekday	9.7	11.0	10.3	8.3	9.6	10.5	10.3
	Trips per household -weekend	9.6	8.3	10.0	8.1	7.9	9.0	8.6
linked trips (c)								
REASON FOR TRAVEL (trips)	Commute	23,000	86,000	31,000	5,000	58,000	29,000	232,000
	Work related business	13,000	72,000	17,000	2,000	44,000	19,000	166,000
	Education/childcare	17,000	66,000	24,000	2,000	37,000	18,000	164,000
	Shopping	31,000	134,000	38,000	4,000	106,000	41,000	354,000
	Personal business	20,000	96,000	19,000	3,000	60,000	29,000	226,000
	Social/recreation	36,000	173,000	48,000	9,000	138,000	66,000	470,000
	Serve passenger	28,000	132,000	45,000	2,000	104,000	43,000	354,000
	Other	4,000	17,000	4,000	2,000	9,000	7,000	43,000
	Total	171,000	775,000	227,000	28,000	555,000	252,000	2,008,000
unlinked trips (d)								
MODE OF TRAVEL (trips)	Vehicle driver	101,000	444,000	138,000	11,000	306,000	153,000	1,153,000
	Vehicle passenger	40,000	208,000	56,000	4,000	129,000	57,000	493,000
	Train	1,000	6,000	3,000	1,000	1,000	1,000	13,000
	Bus	11,000	29,000	5,000	1,000	17,000	9,000	73,000
	Walk only	18,000	86,000	26,000	10,000	90,000	31,000	261,000
	Other modes	5,000	15,000	2,000	2,000	15,000	3,000	42,000
	Total	176,000	788,000	230,000	29,000	558,000	255,000	2,036,000
kilometres								
REASON FOR TRAVEL (distance)	Commute	400,000	1,500,000	523,000	39,000	513,000	598,000	3,574,000
	Work related business	288,000	1,061,000	373,000	35,000	553,000	490,000	2,801,000
	Education/childcare	257,000	459,000	331,000	14,000	245,000	244,000	1,550,000
	Shopping	358,000	1,117,000	298,000	11,000	501,000	432,000	2,718,000
	Personal business	315,000	875,000	207,000	9,000	261,000	445,000	2,113,000
	Social/recreation	388,000	1,954,000	798,000	57,000	798,000	747,000	4,742,000
	Serve passenger	367,000	1,058,000	442,000	11,000	521,000	530,000	2,928,000
	Other	60,000	110,000	25,000	4,000	56,000	45,000	300,000
	Total	2,433,000	8,134,000	2,998,000	180,000	3,449,000	3,531,000	20,725,000
kilometres								
MODE OF TRAVEL (distance)	Vehicle driver	1,535,000	4,969,000	1,986,000	112,000	2,175,000	2,389,000	13,166,000
	Vehicle passenger	453,000	2,120,000	721,000	23,000	847,000	830,000	4,995,000
	Train	48,000	501,000	130,000	5,000	17,000	6,000	706,000
	Bus	225,000	182,000	30,000	14,000	111,000	151,000	712,000
	Walk only	64,000	160,000	69,000	10,000	156,000	100,000	558,000
	Walk linked (e)	77,000	100,000	58,000	8,000	37,000	24,000	305,000
	Other modes	32,000	103,000	4,000	7,000	105,000	31,000	282,000
	Total	2,433,000	8,134,000	2,998,000	180,000	3,449,000	3,531,000	20,725,000
trips %								
REASON FOR TRAVEL (trips)	Commute	13%	11%	14%	19%	11%	11%	12%
	Work related business	7%	9%	8%	6%	8%	7%	8%
	Education/childcare	10%	8%	10%	6%	7%	7%	8%
	Shopping	18%	17%	17%	16%	19%	16%	18%
	Personal business	12%	12%	9%	9%	11%	12%	11%
	Social/recreation	21%	22%	21%	31%	25%	26%	23%
	Serve passenger	17%	17%	20%	7%	19%	17%	18%
	Other	2%	2%	2%	7%	2%	3%	2%
	Total	100%	100%	100%	100%	100%	100%	100%
trips %								
MODE OF TRAVEL (trips)	Vehicle driver	57%	56%	60%	39%	55%	60%	57%
	Vehicle passenger	23%	26%	24%	12%	23%	22%	24%
	Train	1%	1%	1%	2%	0%	0%	1%
	Bus	6%	4%	2%	5%	3%	4%	4%
	Walk only	10%	11%	11%	34%	16%	12%	13%
	Other modes	3%	2%	1%	7%	3%	1%	2%
	Total	100%	100%	100%	100%	100%	100%	100%
distance %								
REASON FOR TRAVEL (distance)	Commute	16%	18%	17%	22%	15%	17%	17%
	Work related business	12%	13%	12%	19%	16%	14%	14%
	Education/childcare	11%	6%	11%	8%	7%	7%	7%
	Shopping	15%	14%	10%	6%	15%	12%	13%
	Personal business	13%	11%	7%	5%	8%	13%	10%
	Social/recreation	16%	24%	27%	31%	23%	21%	23%
	Serve passenger	15%	13%	15%	6%	15%	15%	14%
	Other	2%	1%	1%	2%	2%	1%	1%
	Total	100%	100%	100%	100%	100%	100%	100%
distance %								
MODE OF TRAVEL (distance)	Vehicle driver	63%	61%	66%	62%	63%	68%	64%
	Vehicle passenger	19%	26%	24%	13%	25%	24%	24%
	Train	2%	6%	4%	3%	0%	0%	3%
	Bus	9%	2%	1%	8%	3%	4%	3%
	Walk only	3%	2%	2%	5%	5%	3%	3%
	Walk linked (e)	3%	1%	2%	5%	1%	1%	1%
	Other modes	1%	1%	0%	4%	3%	1%	1%
	Total	100%	100%	100%	100%	100%	100%	100%
VEHICLES	Private vehicles	32,000	116,000	37,000	3,000	80,000	41,000	308,000
	Vehicles per household	1.79	1.65	1.66	0.99	1.38	1.70	1.58
DISTANCE	Total travel (kms)	2,433,000	8,134,000	2,998,000	180,000	3,449,000	3,531,000	20,725,000
	Total travel per person (kms)	51.2	43.2	49.3	28.2	25.2	56.1	41.2
	Av. trip length (kms)	14.2	10.5	13.2	6.5	6.2	14.0	10.3
	Vehicle travel (VKT) (kms)	1,535,000	4,969,000	1,986,000	112,000	2,175,000	2,389,000	13,166,000
	VKT per person (kms)	32.3	26.4	32.7	17.6	15.9	37.9	26.2
TRAVEL TIME	Av. work trip duration (mins)	22	26	26	20	20	22	24
	Av. non-work trip duration (mins)	18	16	16	15	13	16	15
	Av. Trip duration (mins) - all purposes	19	18	18	16	14	17	17
	Daily travel time per person (mins)	68	74	65	70	57	68	67

Source: 2005 five-year pooled Household Travel Survey (HTS) dataset

Notes:

(a) Unless otherwise stated, estimates are for an average weekday. SLA and SSD estimates are rounded to the nearest thousand and sometimes may not add up, but averages and percentages are computed based on actual numbers.

(b) Estimates are based on a sample of households in the respective SLAs and may be subject to high standard errors. For further information, contact TDC.

(c) Population estimates are based on HTS estimates of those in occupied private dwellings.

(d) Estimates of trip purpose are based on linked trip. Trips to return home have been reallocated to the previous 'priority' purpose.

(e) Estimates of trip mode are based on unlinked trips except for walk trips.

(f) 'Walk linked' is a walk trip to change mode to other forms of transport

(g) The geography is based on the 2001 Australian Standard Geographical Classification (ASGC).

3.3 Land Use

Implementation of the Lower Hunter Regional Strategy 2006 (LHRS) and the Maitland Urban Settlement Strategy will have significant impacts on the existing transport and traffic patterns across the LGA. These include:

- Development of major residential release areas has the potential to polarise the city and skew the demographic profile, placing a young, highly mobile and car dependent population on the fringes of the LGA.
- The inclusion of neighbourhood centres within major release areas will impact on the established commercial hierarchy and the level of activity within existing centres. The recent announcement of a major expansion of the Greenhills Centre will directly influence shopping patterns and the future direction for Central Maitland.
- Development of employment generating lands at Rutherford will create additional employment in a localised area.

The future direction for Maitland should continue to include the revitalisation of established areas to encourage the development of communities that are liveable and accessible. Central Maitland's status as a regional centre should continue to be reinforced, with a new direction identified to find the balance between the retail dollar, office and service delivery as well as residential development.

The existing land use zoning for the LGA is shown in Figure 3.1.

The Maitland LGA comprises of the following main activity centres:

Major Centres

- Maitland CBD (primary)
- Green Hills (secondary)
- East Maitland
- Rutherford
- Thornton

Local Retail Centres

- Morpeth
- Largs
- Thornton North
- Metford
- Tenambit
- Lorn
- Telarah
- Aberglasslyn
- Farley
- Anambah
- Lochinvar
- Gillieston Heights
- Woodberry

Therefore, appropriate design guidelines should be incorporated to maintain and improve the function of the above centres. These could include improvements on:

- accessibility,
- community safety,
- pubic environment; and
- mix of uses

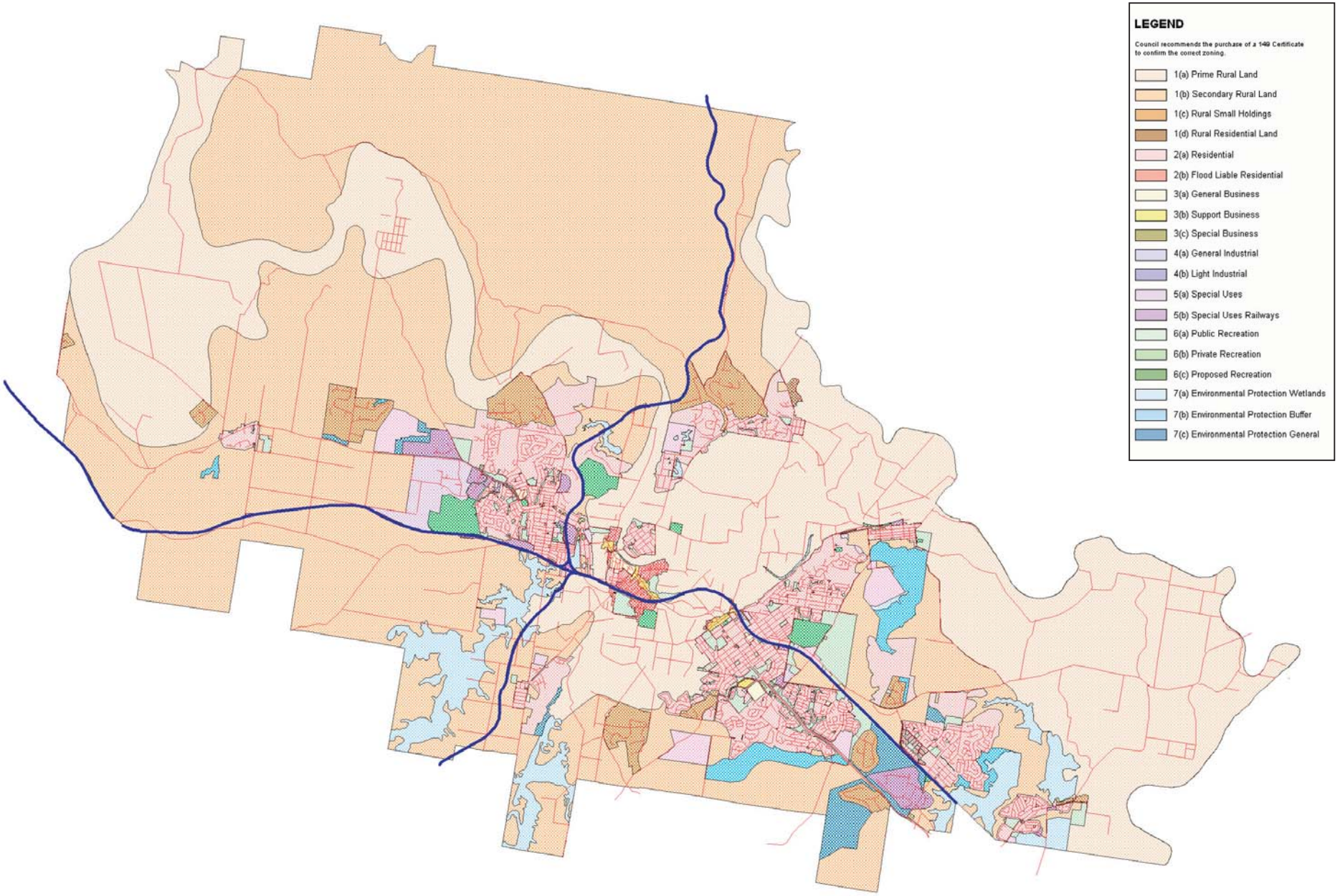


FIGURE 3.1 - EXISTING LAND USE ZONINGS

3.4 Workshops

As part of the study process two workshops were conducted to a) identify issues and develop options and b) to discuss study findings.

The workshop attendance included Council's staff from various departments and the study team members.

The first workshop took place on 8th August 2007 and included the following main tasks related to the City Wide Study:

1. Discussion on vision building and area characteristics
2. Presentation of area analyses by the study team
3. Identification of growth areas within the LGA
4. Development of route network options with respect to existing and future needs.

The main outcomes of the workshop were:

1. Need to review of route network options to alleviate the impact on Melbourne Street due to Third River Crossing proposal by RTA.
2. Route options for consideration in traffic modelling

The second workshop was convened on 28th February 2008 at Council where the following issues to this study were discussed:

1. Report on study progress
2. Presentation on land use and traffic generation
3. Presentation of traffic modelling analyses and discussion.

Consultations

During the course of the study, consultations took place with representatives from Hunter Valley Buses, Ministry of Transport (Regional Co-ordinator) and RTA where relevant issues were discussed and noted. A brief discussion with RailCorp was also made when relevant train patronage data was obtained.

In addition to the workshops, numerous meetings were also held with Council's staff on various issues canvassing relevant aspects: environment and vegetation, flooding, urban development and planning, heritage, transportation and traffic.

3.5 Opportunities and Constraints

In order to highlight issues as part of an integrated land use and transport strategy for the Maitland area, a number of relevant constraints and opportunities have been identified. These are summarised as follows:

Constraints	Opportunities
Public Transport	
Area character with low population density	Interchange facilities
Lack of appropriate state funding for better facilities	Coordinated bus – bus and bus-train trips connection
Lack of direct and fast bus services during peak hours	Bus Time Table information in shopping areas
High level of parking availability	Better ticketing system
Life style and multi purpose trips (school/work/shop etc)	Bus stop information
Lack of door to door services eg supermarket trips	Incentives to promote less car use
	Bus route information guide
Land Use	
Lack of Med/High Density dwellings near Train Stations	Review of land development zoning
Lack appropriate employment land near PT stops	Active developer/government cooperation
Fragmented zoning	Encourage mixed development and zoning
Concentration of similar activities/land uses in localised areas – i.e. 4 supermarkets in Rutherford	Urban design improvements
Active Transport (walk and/or cycle)	
Personal safety and after hours trips	Better lighting scheme
Long distance nature of trips	Provision of wayfinding and information posts
Mix of bicycle routes with vehicular traffic	Provision of more off road bike routes
Deficiency of appropriate facilities throughout the area	Provision of bike rack and storage areas
	Provision of resting/toilets
	Work offices with facilities (shower, bike storage)
	River Access (footpath/cycleway)

4.0 ROUTE NETWORK STRATEGY

4.1 Methodology

The assessment of existing land use, traffic flows and the forecast land use developments has been made to establish a framework for evaluation of future scenarios for the road network system in the study area.

The future traffic flows are estimated for the future road network by developing a trip matrix. This information is obtained from land use zoning maps, RTA Guidelines and/or from available O-D surveys. These have provided a basis for development of a traffic trip matrix/assignment model. The road network scenarios are assessed using EMME/2 program. The intersections analyses are carried out using INTANAL and SIDRA programs.

Forecast trip tables are developed by use of available data and information from the Roads and Traffic Authority and Department of Planning Transport's Strategic Travel Model. In summary the traffic modelling has included:

- linkage of surrounding councils and test its accuracy
- provision of traffic model for the entire Maitland LGA
- provision of a traffic model for daily traffic flow in accordance to the RTA's strategic model

Other modelling issues that have been taken into consideration are as follows:

Regional population and employment growth

- NSW government population and employment forecasts
- Regional major development proposals (Huntlee New Town Proposal)

Regional transport infrastructure changes

- Weakleys Drive Interchange
- Third River Crossing
- Hunter Expressway
- Regional bus reform

Local population and employment growth

- Growth in population spread across investigation areas
- Proportion of workers within the additional population some 14,000
- Anticipated car ownership for the additional population
- Number of new jobs for the additional population: 10,000 new jobs
- Anticipated centres or locations of remaining jobs for the additional population/developments

Table 4.1: Investigation Areas (Maitland Urban Settlement Strategy, 2001-2020)

	Investigation Area	Planned Development Period	Number of lots
1	Thornton North	2007-2022	5,000
2	Gillieston Heights	2007-2019	1,200
3	Aberglasslyn	2007-2020	1,500
4	West Rutherford	2006-2009	400
5	Bolwarra	2007-2010	100
6	Lochinvar	2008-2018	1,000
7	North Gillieston Heights	Medium	120
8	Largs	Medium	300
9	Greta	Medium	50
10	Louth Park	Medium	250
11	Mt Harris	Long	80
12	Windella South	Short	50
13	Luskintyre Road	Short	40
14	Shamrock Hill	Long	50
15	Thornton / Ashtonfield	Medium	525
16	Rutherford Industrial	Medium – Long	400 ha of employment land
17	Farley	Long	Unknown
18	Raworth	Short	150

Note: Strategic estimates only

Local transport/traffic changes

As identified by Council and during the study process one of the main objectives of the study is to encourage more use of public (i.e. train and bus) and active (walk and bicycle) transport in Maitland.

Therefore relevant policy and planning instruments should be developed to support such local transport and traffic initiatives.

4.2 Definition of Assessment Criteria

Road Capacity

The road capacity is described as the maximum number of vehicles that pass a given section of a lane or roadway in one direction (or in both directions for two-lane or multi-lane highway) during a given time period under prevailing roadway and traffic conditions. It is the maximum rate of flow that is expected to occur. This establishes a level of service for road operation.

The term "level of service" has been defined by AUSTROADS as:

A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and or passengers. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. In general there are six levels of service designated from A to F, with level of service A representing the best operating conditions (i.e. free flow) and level of service F the worst (i.e. forced or breakdown flow) .

This study has adopted the RTA's recommendations for Level of Service criteria as set out in its *Guide to Traffic Generating Developments* (1995) (which is based on the *AUSTROADS Guide to Traffic Engineering Practice – Part 2*).

One-way hourly volumes during peak hours for urban and rural roads and recommended levels of service are shown in Tables 4.2 and 4.3, respectively.

Table 4.2: Urban Road Peak Hour Flows per Direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: RTA Guidelines 1995

Table 4.3: One-Way Traffic Volumes for Urban Roads at Different Levels of Service - Interrupted Flow Condition

Type of Road	A	B	C	D	E
2 lane undivided with some parking	360	420	480	540	600
2 lane undivided	540	630	720	810	900
4 lane undivided with some parking	900	1050	1200	1350	1500
4 lane undivided with carriageway	1080	1260	1440	1620	1880

Source: AUSTROADS 1988

Mid-block capacities (vehicle/day) for urban roads are shown in Table 4.4 below.

Table 4.4: Mid-block Capacities (vehicle/day)

No of Lanes	Two way Capacity*
2 lanes undivided	
with parking	12,000
with no parking	18,000
4 lanes undivided	
with parking	30,000
with no parking	36,000
divided and no parking	38,000

* under normal traffic management

Source: modified from "Roadway Capacity" AUSTROADS (1988)

Intersection Operation

The adequacy of the capacity of an intersection is judged by whether it can physically and operationally cater for the traffic using it. The parameters of the performance of an intersection include the degree of saturation (DoS) and the average delay per vehicle (AD).

Satisfactory operation of an intersection would normally continue up to 56 seconds as Average Delay/Vehicle. At this Level of Service (LoS), operating speeds are still reasonable and acceptable delays are experienced. The recommended criteria for evaluating capacity of intersections are shown in Table 4.5.

Table 4.5: Criteria for Evaluating Capacity of Intersection

Level of Service		Degree of Saturation (DoS)	Ave. Delay/ Veh. (Secs)
A/B	good operation	less than 0.80	Less than 28
C	satisfactory	0.80 to 0.85	29-42
D	poor but manageable	0.85 to 0.90	43-56
E	at capacity	0.90 to 1.0	57-70
F	unsatisfactory, extra capacity required	Over 1.0	Over 70

4.3 Route Network Scenarios

The strategic approach to road development seeks to minimise the cost of infrastructure while maximising the benefits in order to meet community needs, economic growth, tourism and transport requirements.

The following aspects are also important in the development of a road network strategy:

- Assessment of land use and strategic planning
- Environmental issues and constraints
- Cost-benefit analysis of options
- The consequential impact of an urban road bypass

The strategic approach comprises two levels:

1. Option evaluation.
2. Strategic planning for the road network arising from the preferred option.

As part of the above item 1, a number of scenarios are considered for investigation, and discussed in this Section.

The assessment of existing land use, traffic flows and the forecast land use developments will provide a basis to establish a framework for evaluation of future scenarios for the road network in the study area. Basically, the assessment of road network scenarios consists of the following:

- the implications on main transport corridor movements
- the impact on local roads and the roads reduced capacity
- the implications of changes on bus/freight movements along the road network.
- the implication for pedestrian movements at specific locations
- The implication of traffic management measures (e.g. one way system or intersection design) on road network and intersection operation.

The above measures are assessed in terms of capacity and level of service for road network and intersection performance.

Thus the assessment of traffic movements for the study area has been carried out in consideration to future growth and increased level of vehicular traffic within Maitland LGA. The overall strategy has been based on development of a route system that could accommodate the need of future population, to complement the existing route system and to reduce delays and congestion along the road network.

Considering the critical role of New England Highway as the main traffic corridor for the LGA as well as its high level of through traffic, the proposed road strategies have aimed to provide alternative parallel routes to complement its function while catering access for the future growth areas.

As part of the route development process a number of optional routes were put forward for assessment. These are shown in Figure 4.1 and include:

Melbourne Street Bypass: this proposal makes use of the existing road network and connects to both the planned Third River crossing eastern route to the north, and a proposed new road to the south, which provides access to both the Maitland showground and the planned Hunter Expressway to the link road.

South Link Road: providing a connection to the planned Third River crossing eastern route via the proposed Melbourne Street Bypass.

The above proposals will provide:

- connection to the planned Hunter Expressway link road via Buchanan Drive
- connection to the planned Third River crossing route via the Melbourne Street Bypass
- a By-pass to East Maitland residential areas
- opportunity to reclaim Melbourne Street to local traffic
- direct access to the Maitland showground.

Inner Link Road: connecting Melbourne Street at New England Highway to Cessnock Road at Mt Dee Road. This link mainly provides a parallel route to Les Darcy Drive to reduce its congestion levels.

Southern Bypass: This route connects the New England Highway at Metford to the New England Highway at Rutherford and provides a major bypass of the New England Highway through Maitland. The route commences at the junction of the New England Highway and Four Mile Creek Road at Metford and joins with the New England Highway at the Rutherford industrial area near the airport. A major connection to the New England Highway is proposed at Telarah via an upgraded Wollombi Road with traffic also able to distribute along the proposed route at Mt Vincent Road, Cessnock Road and Wollombi Road.

Fourth River Crossing: This route connects the growth areas of Aberglasslyn and Oakhampton Heights to Bolwarra with the aim of providing a northern bypass of the central area of Maitland that is completed by the route joining with the Third Hunter River Crossing route to East Maitland. This route also includes a connection to the Maitland CBD via an upgraded Oakhampton Road.

Athel D'Ombrain Drive Upgrade: This route connects High Street to Allan Walsh Drive as part of an upgrade of the Maitland CBD street system (detailed in Part 2 of this Study).

West Maitland Improvements: These road improvements have been identified as part of the West Maitland Transportation Study and therefore are included as part of the future road network scenarios. These are:

- **Widening of New England Hwy, west of Anambah Road to Allandale Road.**
- **A north-south route connecting Wollombi Road to Anambah Road at Beacon Hill Road.**
- **A link between Racecourse Road and the above north-south route.**

The initial assessment of route network system and traffic modelling analyses revealed that some of the options were not feasible on the basis of their very low travel demand and high cost of construction. Accordingly, the following route options are not included as part of the secondary analyses of the route network scenarios:

- Melbourne Street Bypass
- South Link Road
- Inner Link Road

The Fourth River Crossing however is included as part of the future scenarios to show its impact and the level of travel demand within the areas such as Bolwarra and Oakhampton Heights despite the fact that its feasibility in terms of road geometry and high cost of construction would be very limited.

The study has considered eight route network scenarios (using strategic modelling network Emme/2). These are:

1. **2006 - Do Nothing:** the existing route network with no improvements.
2. **2016 - Do Nothing:** the existing route network for the year 2016 population.
3. **2016 - With Infrastructure:** the existing route network with optional routes excluding HE for the year 2016 population.
4. **2016 - With HE:** the existing route network including HE for the year 2016 population.
5. **2026 - Do Nothing:** the existing route network for the year 2026 population.
6. **2026 - Do Nothing with HE:** the existing route network with HE for the year 2026 population.
7. **2026 - With infrastructure and without HE:** the existing route network with optional routes excluding HE for the year 2026 population.
8. **2026 - With infrastructure and HE:** the existing route network with optional routes including HE for the year 2026 population.

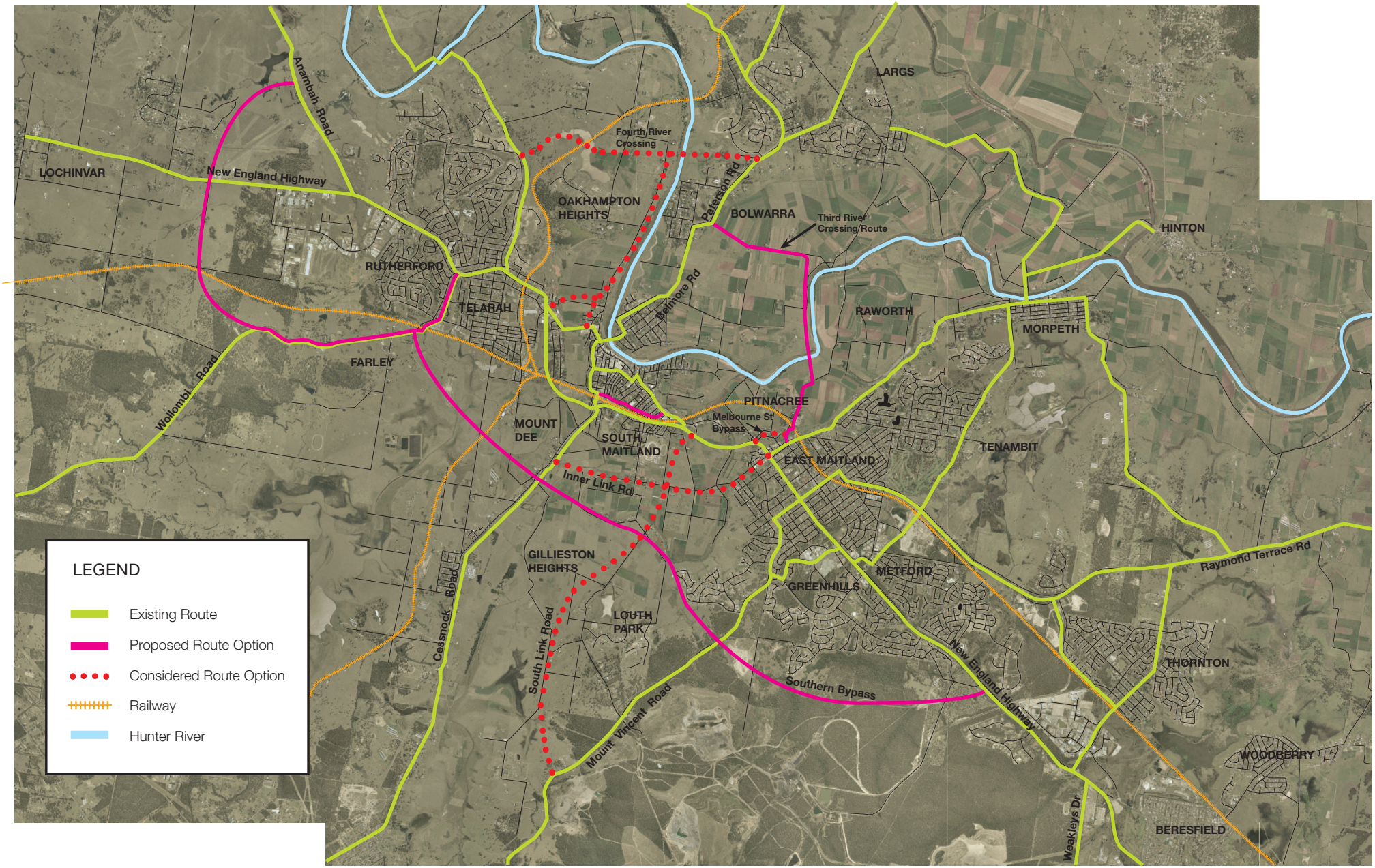
Note:

- The "Do Nothing" options include the existing route network including the Weakleys Drive interchange
- The options with infrastructure proposals are shown in Figure 4.1 including the Planned Third River Crossing
- The Hunter Expressway (HE) scenarios refer to the extension of the F3 Freeway to Branxton as recommended by Transport Needs Study for Lower Hunter.

Table: 4.6: Road Network Scenarios

Year	Do nothing & no HE	Infrastructure & no HE	Do nothing with HE	Infrastructure with HE
2006	•			
2016	•	•	•	
2026	•	•	•	•

FIGURE 4.1A - ROUTE OPTION SCENARIOS



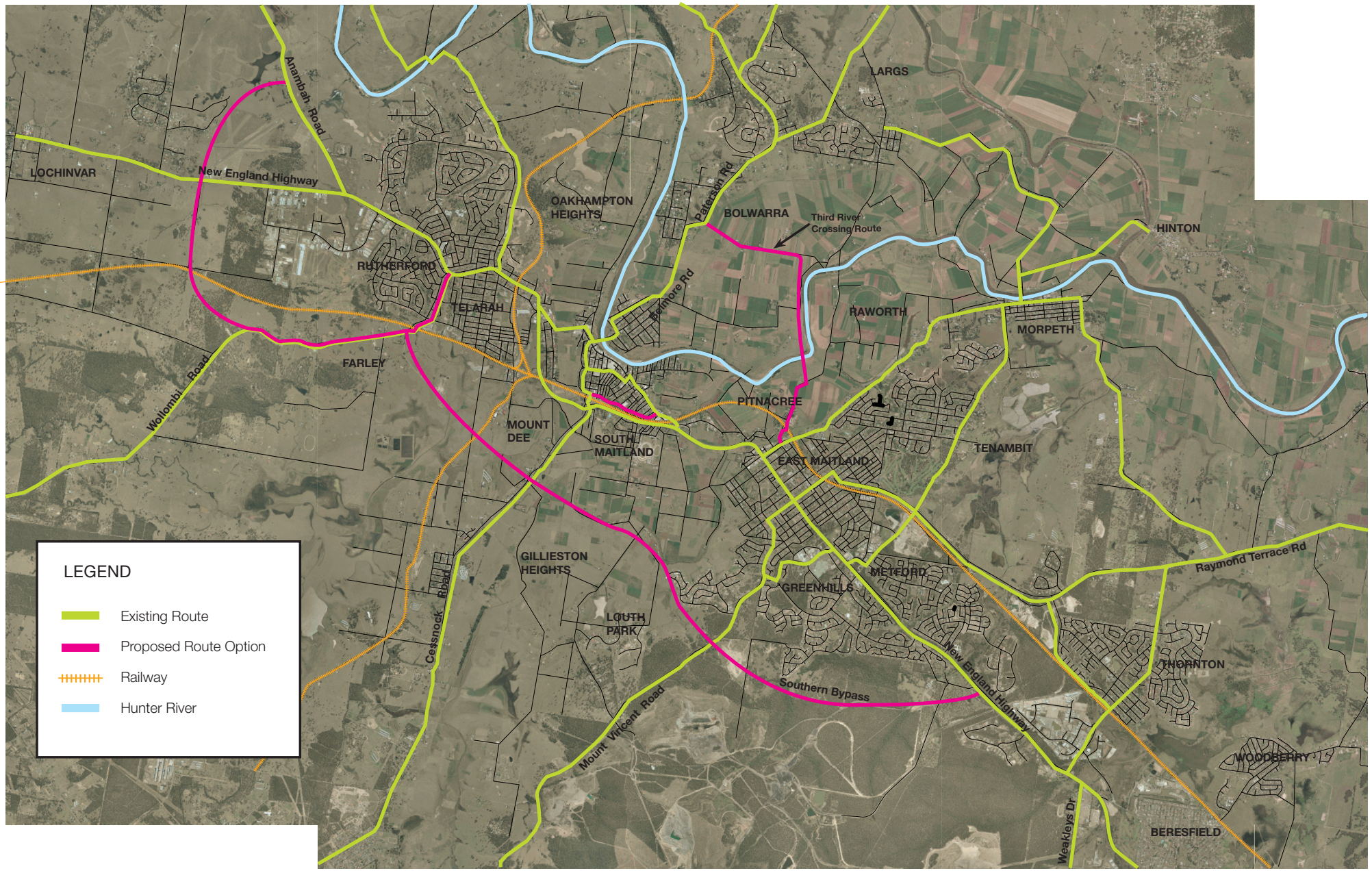


FIGURE 4.1B - PROPOSED ROUTE NETWORK SCENARIOS

4.4 Assessments

The study area has been examined at two levels:

1. Macro level: using strategic transport modelling to assess the impact of the future growth of the area on the route network.
2. Micro level: to examine and test the operational characteristics of the internal road network.

The strategic network assessment has examined seven modelling scenarios (as described in previous section) with respect to traffic analysis. The results of traffic models indicate that once delays are experienced on a travel route, drivers tend to use alternative routes.

The following sections of the route network have further been evaluated by the "Select-Link" analyses (Select Link analysis shows where the traffic is coming from and where it is going to on a selected link, it helps to understand the travel patterns and does not present total volumes on other roadways feeding or being fed by the link):

- Along Raymond Terrace Road to highlight its higher potential use
- Along proposed Southern by-pass to assess its function
- Along Fourth River crossing option to ascertain its impact since its construction could not be justified on high cost basis

This exercise examined the operation of selected routes as well as relevant intersections.

4.4.1 Road Network Analyses

The traffic volumes along major roads within the LGA and the number of effective traffic lanes and estimated hourly one-way volumes have been evaluated and their corresponding level of service are shown in Table 4.7.

The assessment of the existing road network, which is based on current traffic standards and guidelines, indicates that New England Highway operates at its capacity.

Belmore Road will continue to experience a higher level of traffic use with reduced level of service. However, due to its location, surrounding environment and width of Belmore Bridge, its upgrade would be difficult. The findings also highlight that the road widening scheme along Thornton Road should occur in a near future. As shown in traffic modelling results, most routes within the Maitland area operate at an acceptable level of service.

Table 4.7: Major Roads within the Maitland Network

Street	Daily Counts	No of Lanes	Vehicles per lane/hr Estimate	Level of Service
NEW ENGLAND HIGHWAY (SH9)				
W. Anzac St	39,978	4D	1000	D
E. of Melbourne St	45,576	4U	1100	D
W. of Dwyer St	36,326	4D	900	D
S. of Anambah Rd	20,287	2U	1000	D
Thornton Rd Nth of SH9	16,413	2U	800	D
Raymond Terrace Rd (MR104) W of Metford Rd	6,240	2U	350	B
Metford Rd S of Maize St	7,850	2U	400	B
Morpeth Rd (MR102) Nth of Cumberland St	5,460	2U	300	B
Melbourne St (MR102) Nth of SH9	14,400	4U	400	B
Belmore Rd (MR101) (at the bridge)	13,400	2U	700	C
Cessnock Rd (MR195) S of SH9	8,416	2U	450	B
Aberglasslyn Rd Nth of SH9	8,400	2U	450	B
Hausmann Dr Sth of MR104	5,424	2U	300	A
Wollombi Rd W of Bridge	3,810	2U	200	A

Note: SH9 = State Highway No. 9. MR = Main Road

The traffic modelling assumptions has been based on a conservative level of growth with an ultimate population of 92,500 for the Maitland LGA.

The results from the traffic modelling analyses for eight route network scenarios are shown in Table 4.8. These are also illustrated in Appendix A.

The strategic modelling exercise was carried out on the basis of a road network model obtained from the RTA and further modification to the model. The traffic modelling assumptions are based on a conservative level of growth with an ultimate population of 92,500 for the Maitland LGA.

It should be noted that the strategic modelling is based on a shortest path from origin-destination and since the proposed Southern Bypass and New England Highway run parallel, therefore some level of traffic has been shared between these two routes.

It is important that care be taken on the interpretation of data from the modelling results. For example, the 2026 models have slightly different land use characteristics due to the environmental and sustainable measures (such as more infill residential and jobs within the LGA) which would marginally reduce car dependency and level of vehicular trips outside the LGA. This represents a minor decrease of vehicular use along routes particularly on the eastern part of the LGA.

It is the intention of this study to represent a responsible case for future scenarios rather than addressing near worst case projections. This enables us to explore solutions that are realistic and accountable to the community, and, Council's and governmental strategies as well as cautious in the provision of excessive infrastructure.

A further analysis of the model and manual link assessment indicates that the levels of traffic volumes along the roads within the study area are appropriate.

The vehicle/capacity (V/C) ratios for the road network system are illustrated in Figures 4.4B, 4.4D and 4.4E.

The V/C ratio is a measurement of roadway travel performance. It is calculated by dividing the demand flow rate by the capacity for a traffic facility. The demand flow rate is the number of vehicles passing a point on a lane or roadway during some time interval. The capacity is the maximum rate of flow of the roadway under ideal conditions. The V/C ratio is typically measured on critical peak hours.

- Forced or breakdown flow
- At capacity
- Near capacity/Manageable
- Satisfactory

Table 4.8: Traffic Modelling Results - Traffic Volumes (vpd) – (without Fourth River Crossing)

	Counts			2006	2016	2016 + Infra (no HE)	2016 + HE	2026	2026 + Infra	2026 + HE	2026 + HE + Infra
New England Highway (NEH)											
W. of Weakleys Dr	Council		46,153	46,200	57,500	60,700	47,400	52,100	56,000	40,200	41,500
E. of Mitchell Dr				41,400	51,200	39,800	45,100	47,400	36,200	36,400	33,300
W. of Mitchell Dr	RTA	05.8946	40,957	40,900	51,500	39,800	46,300	48,000	36,800	37,300	33,700
W. of Melbourne St	RTA	05.140	46,576	49,400	64,900	44,900	50,900	65,700	53,100	56,400	46,400
W. of Cessnock Rd				30,100	41,200	21,700	31,600	47,700	26,100	36,800	24,200
E. of Aberglasslyn Rd				36,300	49,900	29,700	42,700	52,100	36,300	47,800	34,300
W. of Denton Park Dr	RTA	05.062	20,287	20,500	30,900	19,900	24,400	34,000	27,400	28,700	26,200
W. of Anambah Rd				18,000	28,700	17,900	17,200	32,400	25,700	26,800	24,500
Thornton Rd											
N. of New England Highway				14,400	19,800	18,500	18,300	35,400	34,400	31,500	30,800
Raymond Terrace Rd											
E. of Metford Rd				13,700	18,200	17,900	16,700	29,500	30,100	24,700	25,800
W. of Metford Rd				6,500	8,700	9,900	6,200	17,800	19,300	13,800	15,300
Metford Rd											
N. of Raymond Terrace Rd				6,500	8,100	6,500	7,800	7,500	6,700	7,000	6,400
S. of Raymond Terrace Rd				4,900	5,200	5,100	5,000	8,800	8,600	7,600	7,800
Other Major Roads											
Morpeth Rd N. of Cumberland St				6,300	6,200	7,300	7,600	7,400	7,500	7,800	7,800
Melbourne St (N. of NEH)	RTA	05.539	14,408	13,300	15,700	20,300	13,300	20,500	20,100	15,500	20,100
Belmore Rd (at the bridge)	RTA	05.341	13,369	13,300	16,300	9,500	16,000	17,500	11,100	17,800	11,500
Cessnock Rd (S. of NEH)				8,000	15,500	13,100	19,000	19,400	17,000	22,600	19,200
Aberglasslyn Rd (N. of NEH)				8,300	12,300	9,500	12,700	13,200	10,000	13,500	10,000
Wollombi Rd under the bridge				4,400	4,000	6,600	9,000	8,500	6,900	4,100	7,700
Weakleys Dr				14,366	19,750	18,480	17,600	35,423	34,372	31,484	30,789
Southern Bypass											
Between NEH - Buchanan Rd						14,058			14,552		3,912
Between Buchannan - Louth Park						17,202			19,102		7,152
Between Louth Park - Cessnock Rd						16,808			18,630		6,784
Between Cessnock Rd - Wollombi Rd						18,636			22,456		11,828

HE = Hunter Expressway

The following main points are made based on the assessment of the traffic modelling scenarios:

1. The New England Highway will experience a high level of traffic volume by the year 2016 and it will continue until 2026.
2. The difference plots on two scenarios for 2026,"Existing Network" vs "Existing Network and Hunter Expressway" indicates that construction of the Hunter Expressway will attract some 12,000 vpd from New England Highway.
3. The difference plots on two scenarios for 2026,"Existing Network" vs "Proposed Network with no Hunter Expressway" indicates that the Southern Bypass will attract some 22,000 vpd from the New England Highway i.e., a reduction of some 10,000 vpd local traffic and reduction in 12,000 vpd through traffic (i.e. if the Bypass would be built).
4. The difference plots on two scenarios for 2026,"Proposed Network" vs "Proposed Network and Hunter Expressway" indicates that the inclusion of the Hunter Expressway will reduce some 12,000 vpd from the proposed Southern Bypass with minimal impact on New England Highway.
5. It is clearly evident that the proposed Southern Bypass will play an important strategic role and function as part of the future route system for the LGA. It provides a complementary corridor to New England Hwy and the Hunter Expressway.
6. The construction of the Hunter Expressway will alleviate, only partially, the level of traffic volumes along the route system within the LGA.
7. The assessment of volume to capacity results for two 2026 scenarios: "Proposed Road network including Southern Bypass" vs : "Existing Road Network with Hunter Expressway" reveals that New England Highway and Cessnock Road, both will experience a better level of service as part of the "Proposed Road Network with Southern Bypass". In summary, it indicates that the proposed Southern Bypass will have a more positive impact on the operation of the road network than the Hunter Expressway.
8. Considering all future scenarios, Raymond Terrace Road (will experience a high level of traffic volume particularly at its section west of Thornton Rd - Haussman Drive).
9. The select link analysis for Raymond Terrace Road indicates a considerable level of movement between Raymond Terrace to Weakleys Drive, Green Hills and East Maitland (about 4,000 vpd to/from Weakleys Drive and 4,000 vpd to/from remaining).
10. The select link for the proposed Southern Bypass clearly shows the need for vehicular movements between West Maitland and Weakleys Drive.
11. The proposed Fourth River Crossing select link analysis indicates the localised nature of its movement activities (some 2500 vpd with over 500 vpd associated with West Maitland). Therefore, implementation of the proposal will not result in a highly beneficial road scheme for the area. Parts of this traffic will be distributed along Aberglasslyn and Belmore Roads.
12. Cessnock Road will have a greater role as part of the road network in coming years. The implementation of Hunter Expressway would encourage a higher use of Cessnock Road which will require a major treatment at their intersection.
13. By the year 2026, Belmore Road could experience a traffic volume of some 19,000 vpd if a "Do Nothing" scenario (i.e. existing network) is adopted but if a "Proposed Road Network with or without Hunter Expressway" would be implemented, its traffic volumes will be in order of some 13,000 vpd.
14. The widening of Haussman Drive will be required by the year 2016.
15. Melbourne Street will experience high traffic volumes due to the Third River Crossing measures. Therefore its operational characteristics need to be monitored to maintain its environmental amenities. Currently, more use of other streets such as Riley Street has been observed for those wishing to travel west.
16. The overall assessment of all scenarios guides us to the conclusion that the proposed Southern Bypass is a viable option that should seriously be considered as part of the future road network. It is also evident that if such measures are not taken, the route system will experience a very low level of service.
17. It is important to note that the proposed southern bypass is not a substitute for the Hunter Expressway. Its function is independent from Hunter Expressway as it provides an appropriate level of service for the route network within the LGA (hence better circulation and efficiency).

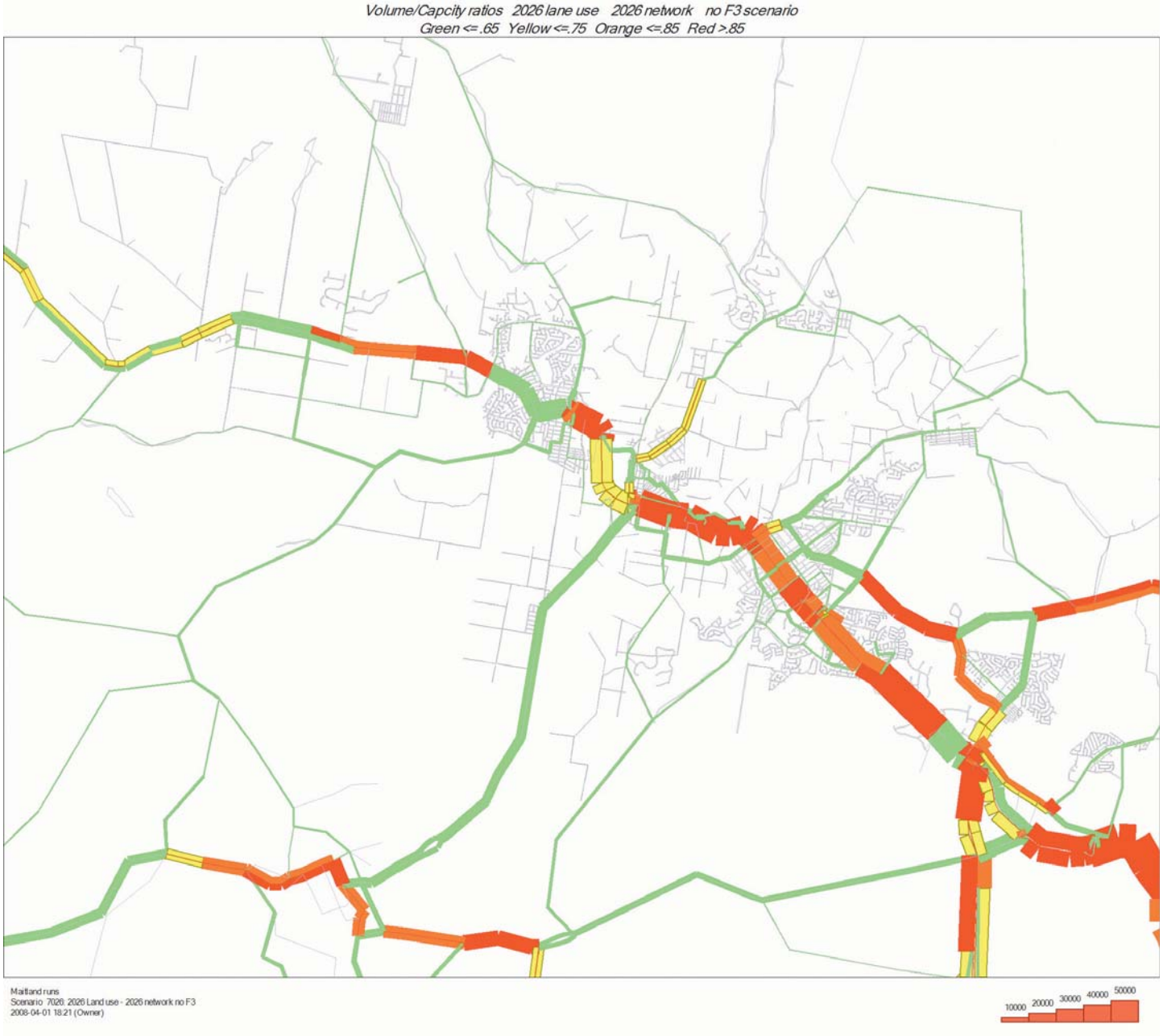
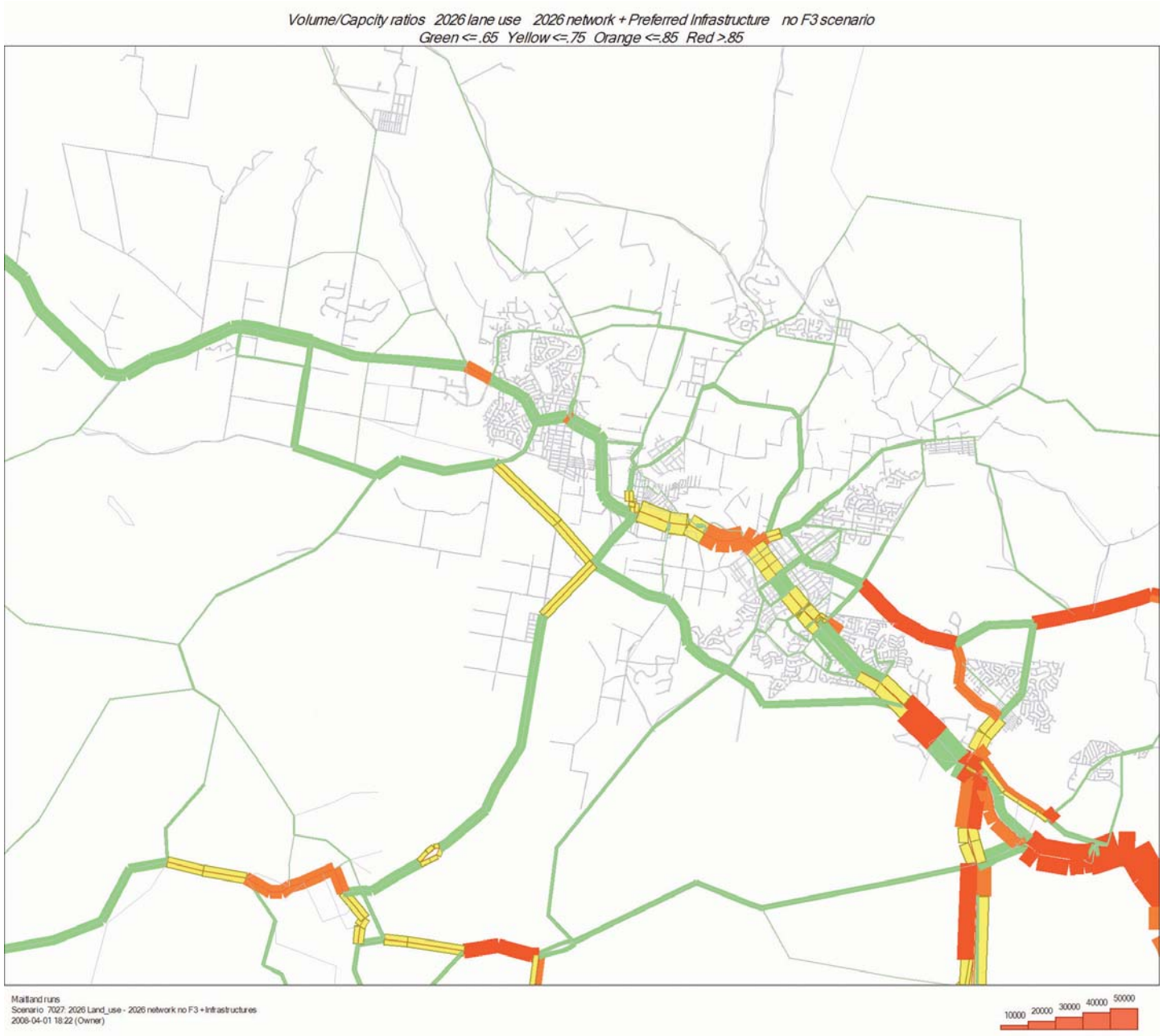


FIGURE 4.4B - LEVEL OF SERVICE (2026) – EXISTING NETWORK

FIGURE 4.4D - LEVEL OF SERVICE (2026) – PROPOSED NETWORK

(See Appendix for other figures eg Figure 4.4C)



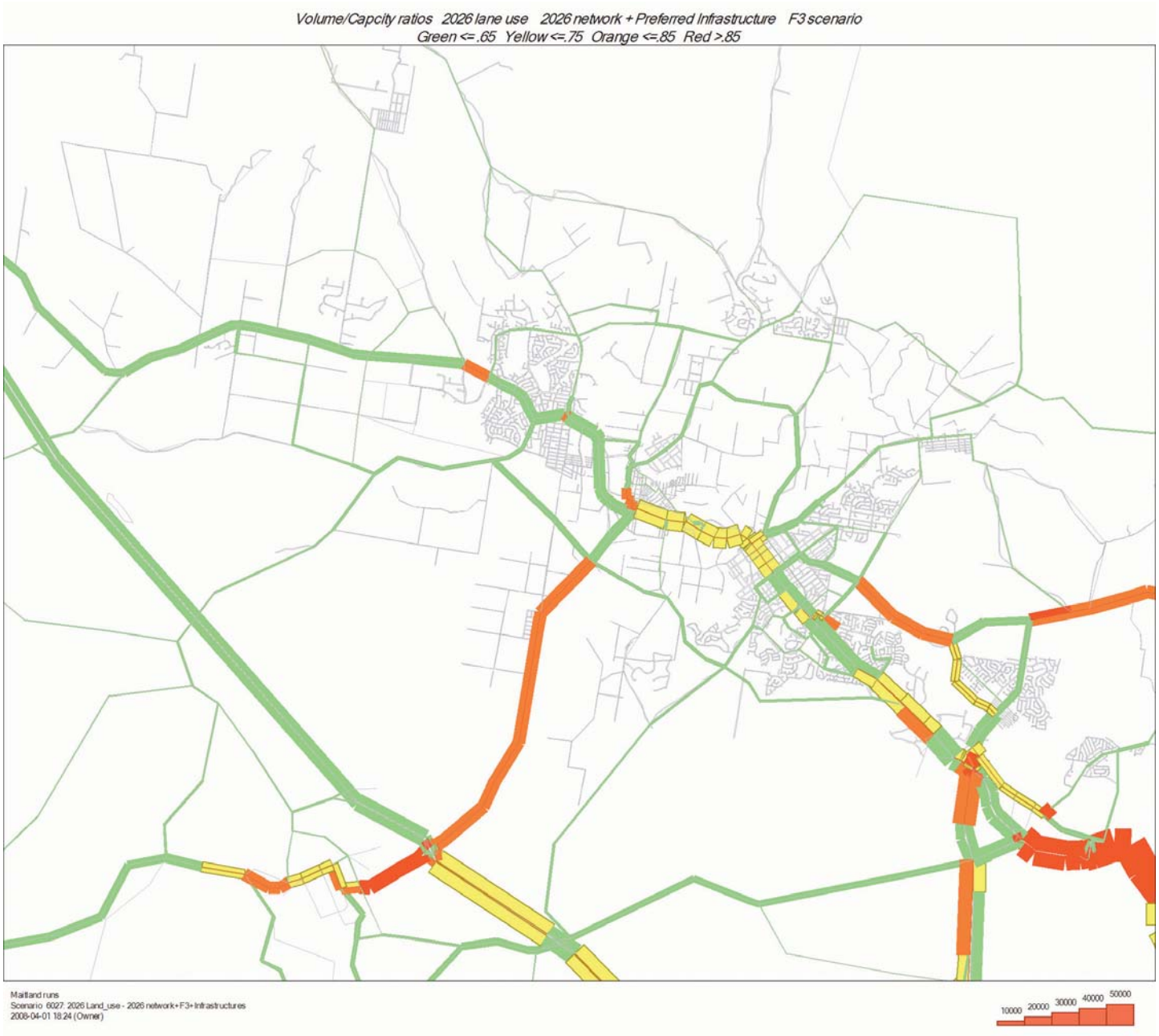


FIGURE 4.4E - LEVEL OF SERVICE (2026) – PROPOSED NETWORK+HUNTER EXPRESSWAY (HE)

4.4.2 Intersection Evaluation

The operational assessment of major intersections within the study area for the existing and future scenarios has been carried out.

The results of the analyses as shown in Table 4.9 reveal that most intersections will experience a lower level of service and therefore require improvement and appropriate treatment.

The treatments generally include installation of traffic signals with/or provision of additional lanes for turning movements.

Key findings from the assessments of intersections' operation for the existing (2006) and future situations (2026) include:

- The intersection of Les Darcy Drive/Church Street/Cessnock Road will require additional slip lanes for turning movements (particularly from Church onto Les Darcy Drive) for the current situation. This measure together with the proposed traffic signals at Louth Park Road (this also provides gap for the approach to roundabout) would significantly reduce the current problems. The closure of its fifth leg - Walker Street, could also be considered. The proposed road network including Third River Crossing will considerably improve the future operation of this intersection.
- The intersection of New England Highway with High Street (near the Maitland Hospital) currently experiences a relatively high level of queues (particularly along westbound and southbound approach). Its operation could marginally be improved due to future installation of traffic signals at John and Young Streets (as part of the RTA's program) by creating gap along New England Highway, southbound. Re-configuration of the site for installation of traffic signals should be further investigated as part of the future road network program.
- The intersection of New England Highway and Racecourse Road operates at a good level of service and will continue to operate at an acceptable level of service with some turning movements experiencing moderate level of delays.
- An intersection treatment will be required at intersection of New England Highway with Wollombi Road while the intersection of New England Highway and Aberglasslyn Road should be upgraded (for turning movements) as part of the future scenarios.
- The intersection of Raymond Terrace Road and Metford Road is currently controlled with a roundabout. Its performance should be monitored as part of the future scenarios for possible upgrade with traffic signals.

Most intersections along the road network continue to operate at a good level of service due to low level of traffic volumes such as Glenarvon and Flat Roads or Largs Avenue and Paterson Road. However, installation of traffic control device could be considered at such locations on the basis of road safety and traffic management grounds. These should be addressed as part of the local traffic committee items or localised traffic studies.

Note:

1. above are strategic estimated figures for the future scenario and subject to further assessment
2. Some intersections such as NEH/High/Johnson are assessed as part of the Part 2: CBD Study

Key: LoS: Level of Service; DoS: Degree of Saturation; AD: Average Delay.

Table 4.9: Peak Hour Intersection Performance - Existing and Future

Intersection	LoS	DS	AD	Comments
NEH/Thornton Rd				
Existing	A	0.49	10.4	Traffic Signal
Future	B	0.66	15.0	left in/out only
NEH/Chemsford Dr				
Existing	A	0.63	11.0	Traffic signals
Future	B	0.73	20	
NEH/Cessnock Rd				
Existing	D	0.90	50	"F" at some movements
Future	F	0.86	18.8	Slip lanes are required
NEH/Wollombi Rd				
Existing	C	0.57	30.2	
Future	F	>1.20	>100	Need upgrade; possible signals
NEH/Racecourse Rd				
Existing	B	0.78	15.7	Roundabout
Future	C/D	0.80	48	
NEH/Anambah Rd				
Existing	B	0.16	18.7	Roundabout
Future	C	0.63	42.0	Full use of roundabout
NEH/Aberglasslyn Rd				
Existing	C	0.89	29	Traffic signals (high RT)
Future	F	>1.20	>100	Need upgrade eg, turning lanes
NEH/High St (at S Maitland)				
Existing	A	0.61	12.9	Traffic signals
Future	B	0.90	27	
Metford Rd/ Raymond T Rd				
Existing	B	0.50	24.3	Roundabout
Future	F	>1.20	>100	Need upgrade eg, signals
NEH/Roberts Road				
Existing	A	0.31	7.6	T-intersection
Future	A	<0.20	<10	Traffic signals

4.5 Summary

The assessment of road network within the Maitland LGA revealed that some sections of New England Highway are operating at capacity. The modelling results indicated that the road system will experience a higher use of vehicular traffic with reduced level of service. Accordingly, alternative road proposal such as Southern Bypass and upgrade of Raymond Terrace Road need to be further investigated for future implementation. The nominated works are identified in Chapter 6.0.

Table 4.10: Road Network Assessment - Overview

ROADS	STATUS - Current and 2026	Requirements
NEW ENGLAND HIGHWAY SECTIONS		
Weakleys Dr to Melbourne St	Operating at capacity and will be saturated in 2026.	Construction of Hunter Expressway or Southern Bypass (SBP) will maintain an appropriate level of service.
Melbourne St to Cessnock Rd	Operating at capacity and will have an unacceptable LoS in 2026.	Will operate at satisfactory LoS by introduction of SBP. Will operate at capacity with Hunter Expressway.
Cessnock Rd to High St	Operating at acceptable LoS and will continue to operate at capacity.	Will operate at acceptable LoS provided intersection treatment will take place.
High St to Anambah Rd	Operating at satisfactory LoS and will continue to operate at similar LoS.	Will operate at acceptable LoS with minor delays at intersection.
Anambah Rd to West	Operating at capacity at certain sections and will experience lower LoS as part of the future scenarios.	Will operate at satisfactory LoS by introduction of SBP and Hunter Expressway.
MAJOR ROADS		
Anambah Rd	Will continue to operate at satisfactory LoS.	Relevant road guidelines and maintenance should be employed.
Wollombi Rd	Will continue to operate at satisfactory LoS.	Road and intersection upgrade will be required along its length to comply with standards.
Aberglasslyn Rd	Will continue to operate at satisfactory LoS.	General road upgrade will be required along its links to comply with the standards.
Oakhampton Rd	Will continue to operate at satisfactory LoS.	Road upgrade will be required along its length to comply with standards.
Paterson Rd	Will continue to operate at satisfactory LoS.	Road upgrade will be required along its length to comply with standards.
Cessnock Rd	Currently operating at satisfactory LoS, will be at capacity by 2016.	Upgrade will be required once Hunter Expressway is completed.
Metford Rd	Will continue to operate at satisfactory LoS.	General road upgrade will be required along its links to comply with the standards.
Raymond Terrace Rd	Currently operating at satisfactory LoS, will be at capacity by 2016.	Its upgrade (at east of Metford Rd) will be required as part of the future road improvement program.
Government Rd	Currently operating at satisfactory LoS.	Its upgrade should be monitored as part of the future road improvement program.
Thornton Rd	Currently operating at satisfactory LoS, will be at capacity by 2026.	Full four lane carriageway should be maintained - its operation should be closely monitored as it could experience traffic volumes exceeding 35,000 vpd by 2026.
Louth Park Rd	Currently operating at satisfactory LoS and will continue to operate at a similar LoS.	General road upgrade will be required along its links to comply with the standards.
Mt Vincent Rd	Currently operating at satisfactory LoS and will continue to operate at a similar LoS.	General road upgrade will be required along its links to comply with the standards.
Melbourne St	Will continue to operate at satisfactory LoS with volumes of over 20,000 vpd.	Special consideration should be taken to maintain street amenity.
Belmore Rd	Currently operating at satisfactory LoS, will be at capacity by 2026.	Construction of SBP will significantly improve its LoS.
Morpeth Rd	Will continue to operate at satisfactory LoS.	Shoulder widening at certain sections would be needed.
Glenarovan Rd	Low traffic volume is currently experienced.	Further traffic modelling will be required for detailed assessment.

LoS - Level of Service

5.0 CITY ACCESS PLAN

5.1 Introduction

This study aims to develop an Access Plan that provides a strategic direction for better accessibility and movement for the community in Maitland. The study puts forward policies and measures to address the relevant issues that are practical, fair and achievable.

One of the main objectives of the Plan is to encourage more use of public and active (walk and bicycle) transport among the community; considering the very low levels of active and public transport in Maitland (as shown in Table 5.1). This initiative is and will be supported by appropriate policy and planning instruments. Therefore, a lower use of car as a mode of transport would be an achievable task as part of a transport strategy for Maitland over a period of 20 years.

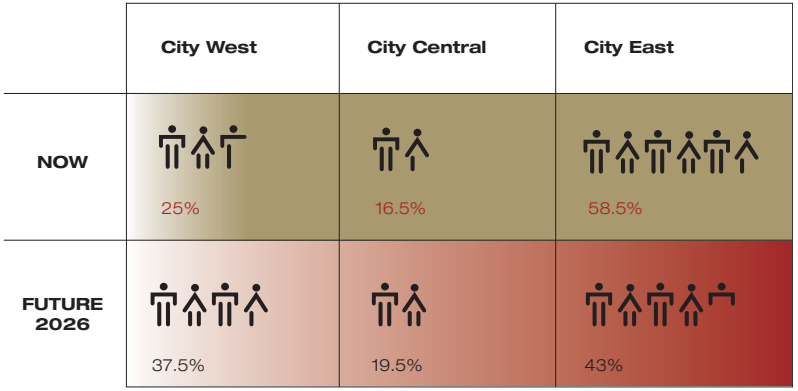
Table 5.1: Journey to Work Trips (Active and Public Transport)

Mode of Travel	1991	1996	2001	2006
Train	3.2%	2.8%	2.4%	2.2%
Bus	1.7%	1.1%	0.7%	0.4%
Bike	0.7%	0.6%	0.4%	0.4%
Walk	3.3%	2.7%	2.2%	2.0%
Total	7.9%	6.2%	5.7%	5.0%

The continuing growth of the City is also very evident and this as well requires appropriate planning for its future needs in terms of infrastructure and land use. Therefore overall strategy embraces all modes of transport with a view to improve movements and accessibility within the area including route network.

It is intended that while this study explores strategic measures, individual "local plans" would be developed for each area to assess its needs as the area experiences growth and expansion. The current Maitland Bike Plan provides comprehensive bike routes throughout the LGA. This could further be developed in conjunction with future pedestrian facilities as part of a 'local plan' for each area.

Maitland Population Distribution (now and future)



Journey to Work – Travel Mode in Maitland LGA

Mode/ Year	1991	1996	2006
PT	5.2%	4.0%	2.7%
AT	4.0%	3.3%	2.4%
CP	10.7%	8.0%	6.7%

PT: Public Transport: Train, Bus and Taxi
AT: Active Transport: Walk and Bike
CP: Car passenger

Table 5.2: Maitland Population by Suburb

Area	2001	2006	2011	2016	2021
Aberglasslyn & District	1,196	2,335	5,030	7,583	9,333
Thornton (part) - Chisholm	6,099	8,228	10,458	14,478	20,728
Morpeth & District	2,174	2,608	3,008	3,446	3,446
Bolwarra & District	3,576	4,214	4,544	5,044	5,044
Rutherford	7,490	8,819	9,344	11,219	14,024
Ashtonfield - Avalon Estate	3,520	4,114	4,114	4,239	4,239
Metford - Woodlands Estate	3,857	4,498	4,498	4,498	4,498
East Maitland - Louth Park	9,631	10,448	11,218	11,218	11,218
Rural West	2,410	2,425	3,820	7,633	16,383
Maitland Central - Gillieston Heights - Cliftleigh	5,079	5,077	7,237	9,825	9,987
Telarah - Mount Dee	2,344	2,295	2,295	2,295	2,295
Tenambit	2,968	2,902	2,902	2,902	2,902
Woodberry	3,459	3,270	3,270	3,270	3,270
CITYWIDE	**55,804**	**63,239**	**73,749**	**89,664**	**107,366**

Table 5.2: Continued

	ANNUAL GROWTH RATE				
Area	2001/2006	2006/2011	2011/2016	2016/2021	2006/2021
Aberglasslyn & District	14.3%	16.6%	8.6%	4.2%	9.7%
Thornton (part) - Chisholm	6.2%	4.9%	6.7%	7.4%	6.4%
Morpeth & District	3.7%	2.9%	2.8%	0.0%	1.9%
Bolwarra & District	3.3%	1.5%	2.1%	0.0%	1.2%
Rutherford	3.3%	1.2%	3.7%	4.6%	3.1%
Ashtonfield - Avalon Estate	3.2%	0.0%	0.6%	0.0%	0.2%
Metford - Woodlands Estate	3.1%	0.0%	0.0%	0.0%	0.0%
East Maitland - Louth Park	1.6%	1.4%	0.0%	0.0%	0.5%
Rural West	0.1%	9.5%	14.8%	16.5%	13.6%
Maitland Central - Gillieston Heights - Cliftleigh	0.0%	7.3%	6.3%	0.3%	4.6%
Telarah - Mount Dee	-0.4%	0.0%	0.0%	0.0%	0.0%
Tenambit	-0.4%	0.0%	0.0%	0.0%	0.0%
Woodberry	-1.1%	0.0%	0.0%	0.0%	0.0%
CITYWIDE	**2.5%**	**3.1%**	**4.0%**	**3.7%**	**3.6%**

Areas and land supply from UDP figures and ID suburbs

5.2 Public Transport

5.2.1 Bus

Bus services in Maitland provide local services with connections to Singleton and Branxton and linking Raymond Terrace and Newcastle via Hexham and Medowie. The local bus routes are shown in Figure 5.1.

In addition to normal bus services, Maitland "On-Call" bus services also provide on route pick up and set down services at night times, weekends and pubic holidays. It is possible to make pre-bookings for the On-Call bus as well.

The new Lower Hunter Transport Guide provides comprehensive information about all of the public transport services within the Maitland LGA and the region. The guide is available free of charge.

The condition of bus stops along major routes is currently under review by Council. This is in response to the NSW Ministry of Transport initiatives on the upgrading of public transport signage and information display as well as their partial funding.

Bus patronage within the Maitland LGA has accounted for 0.4% of journey to work travel mode (ABS 2006). The 1991, 1996 and 2001 census data however show figures of 1.7%, 1.1% and 0.7%, respectively. This clearly indicates a gradual reduction of 1.3% bus use as a mode of travel for journey to work trips during this period.

Consequently, the main activities of the bus operators have been directed to attract more patronage among non-work related travels; such as school/educational, shopping, recreational and service (i.e. medical, post office, etc) travels among people with no or low access to motor vehicles.

5.2.2 Rail

The Maitland Rail Corridor provides services throughout the LGA and consists of 9 local stations including Thornton, Metford, Victoria Street, East Maitland, High Street, Maitland, Telarah, Lochinvar and Mindaribba. The section between Telarah and Thornton Stations covers a distance of 14.2 km.

Given the current residential land uses around the stations the local rail passenger service would mainly function as a commuter service between the surrounding residential areas to the City of Newcastle and Maitland.

Figure 5.2 shows the location of train stations within the LGA including pedestrian accessibility within 500 m from each station. A review of railway station facilities has been carried out and is detailed in Table 5.3.

Table 5.3: Summary of Stations Facilities

Facility	Telerah	Thornton	Metford	Victoria St	East Maitland	High St	Maitland
Off-Street Parking Capacity	24 (45%)	63 (80%)	70 (5%)	86 (70%)	30 (-)	15 (65%)	100 (75%)
Vehicular xing	Yes	Yes	At grade	N/a	N/a	No	Yes
Disabled Access	Yes	Yes	Yes	No	No	No	Yes
Scheduled Bus Stop	Yes	Yes	Yes	Yes	No	No	Yes
Ticket Machine	Yes	Yes	Yes	Yes	Yes	No	Yes
Waiting Room	No	Yes	No	Yes	Yes	No	Yes
Covered Platform	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Restrooms	Yes	Yes	No	Yes	Yes	Yes	Yes
Bus Bay Adjacent	No	Yes	Yes	Yes	No	No	Yes
Bus Shelter	No	Yes	Yes	Yes	No	No	Yes
Pick up/set down	Yes	Yes	Yes	Yes	Yes	No	Yes
Bicycle Stand/ Lock	Yes	No	Yes	No	Yes	No	Yes
Public Telephone	Yes	Yes	No	Yes	Yes	No	Yes
Easy Access	N/a	Yes	Yes	No	No	No	Yes
Security Camera	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Light	Yes	Yes	Yes	Yes	Yes	Yes	Yes

During the study process, preliminary discussions took place with RailCorp. Subsequently, patronage data for each railway station for 2007 has been obtained and is shown in Table 5.4. It indicates that Maitland, Victoria Street and Beresfield stations have the highest patronage, respectively. A comparison of 1993 and 2007 patronage data also is shown in Table 5.5. The results show that rail patronage has reduced marginally.

The Census data also indicates similar results (i.e. a reduction of 1% train use between 1993 and 2007.

Table 5.4: Weekday Patronage along the Rail Corridor Stations - 2007 Barrie C

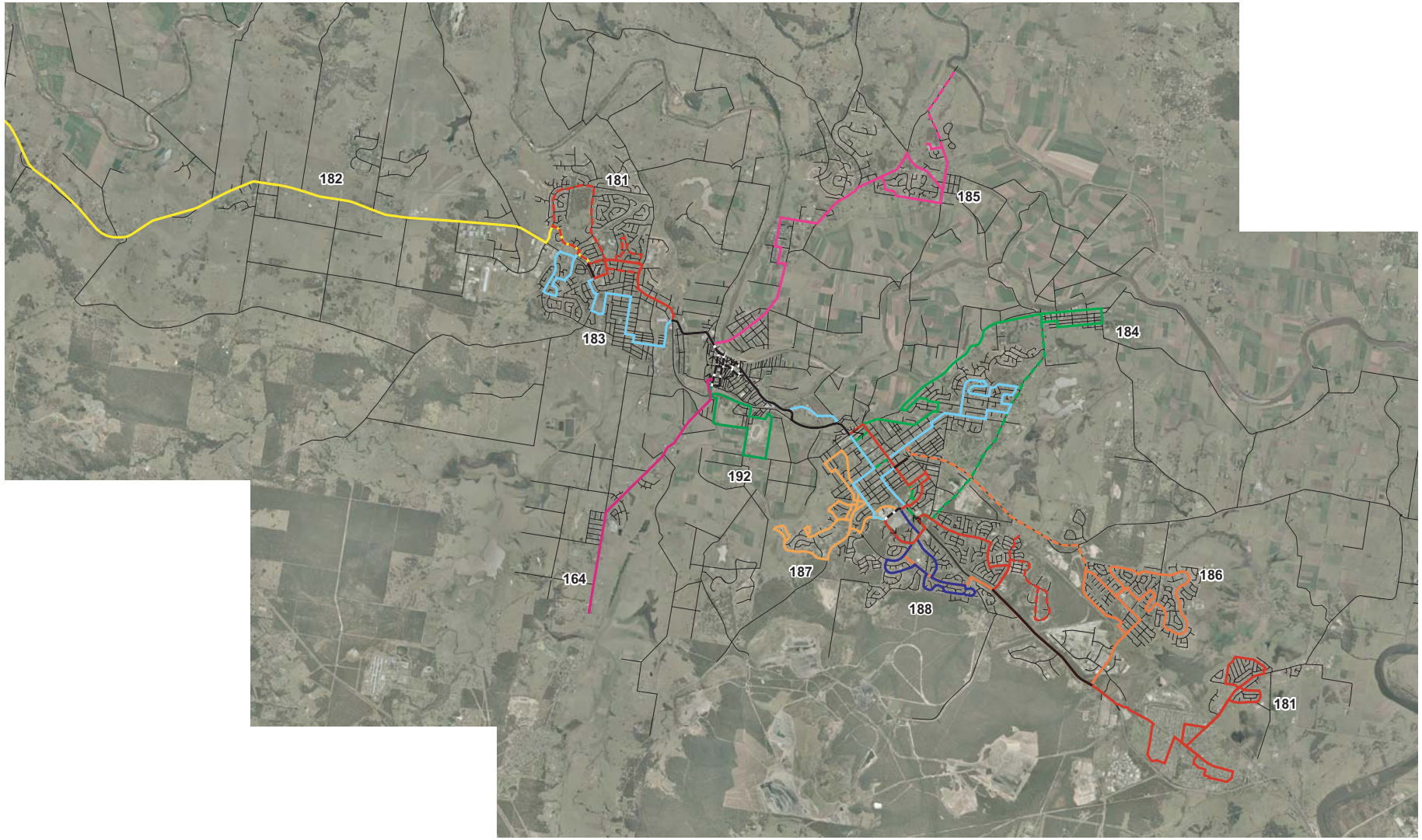
	02:00 to 06:00		06:00 to 09:30		09:30 to 15:00		15:00 to 18:30		18:30 to 02:00		24 Hours		Total
Station	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	
Beresfield	0	0	170	80	130	100	70	170	10	30	380	380	760
East Maitland	0	0	20	50	50	40	50	20	0	10	120	120	240
High Street	0	0	30	40	40	40	30	40	10	0	110	110	220
Maitland	0	10	200	110	190	220	160	190	20	50	570	570	1140
Metford	0	0	120	20	60	70	30	110	10	10	220	220	440
Thornton	0	0	170	30	60	90	60	160	10	20	300	300	600
Victoria Street	0	0	190	50	120	120	80	180	20	50	410	410	820

Table 5.5: Rail Patronage Comparison 1993 and 2007

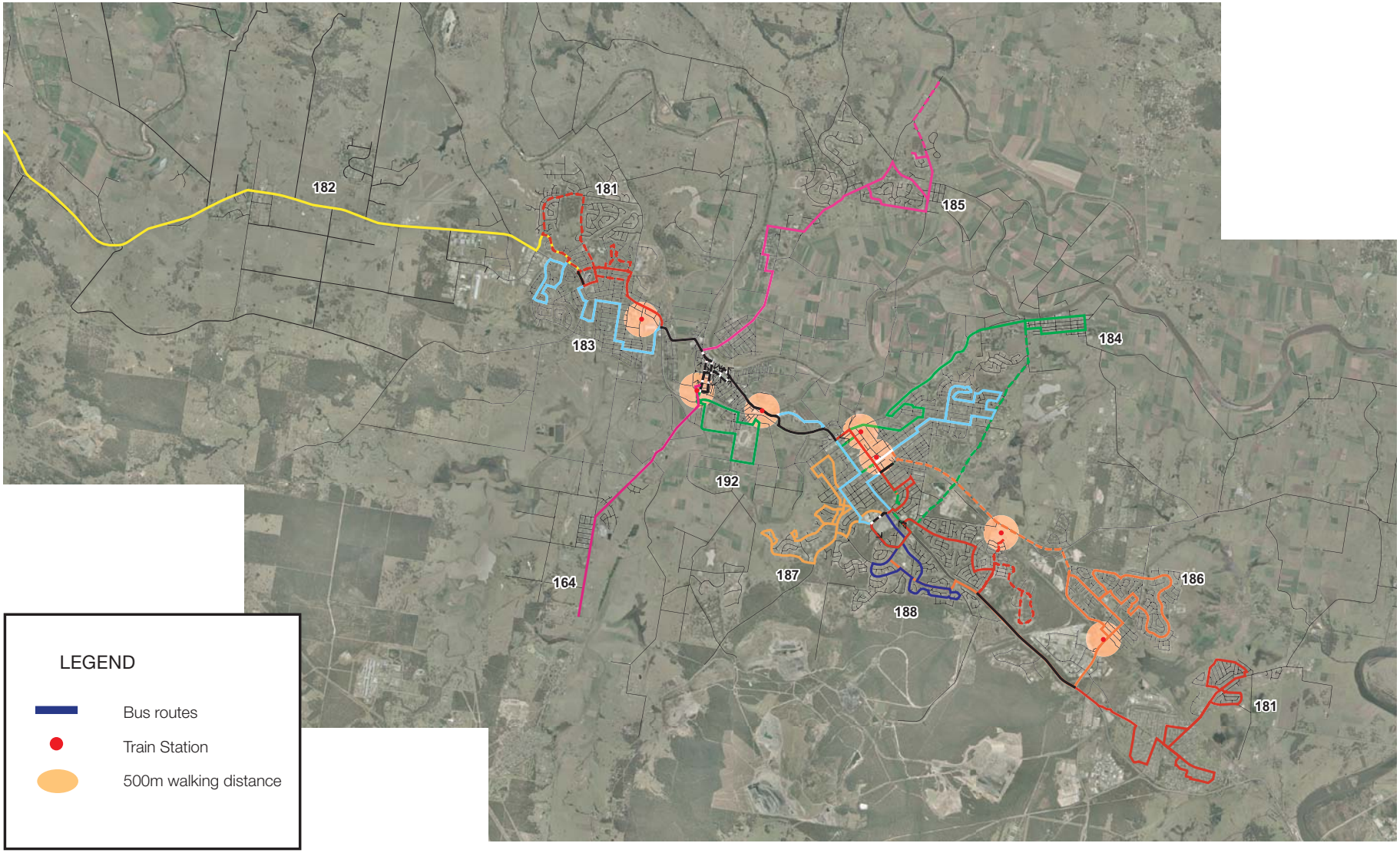
Stations	1993	2007
Beresfield	1,209	760
Thornton	607	600
Metford	480	440
Victoria Street	1286	820
East Maitland	351	240
High Street	324	220
Maitland	1,517	1,140

Source: (Maitland Rail Corridor Study URaP for GHD 1995) and RailCorp 2007

FIGURE 5.1 - EXISTING BUS ROUTES



Note: Lower Hunter Transport Guide provides comprehensive information about all the public transport services in the region



Note: Lower Hunter Transport Guide provides comprehensive information about all the public transport services in the region

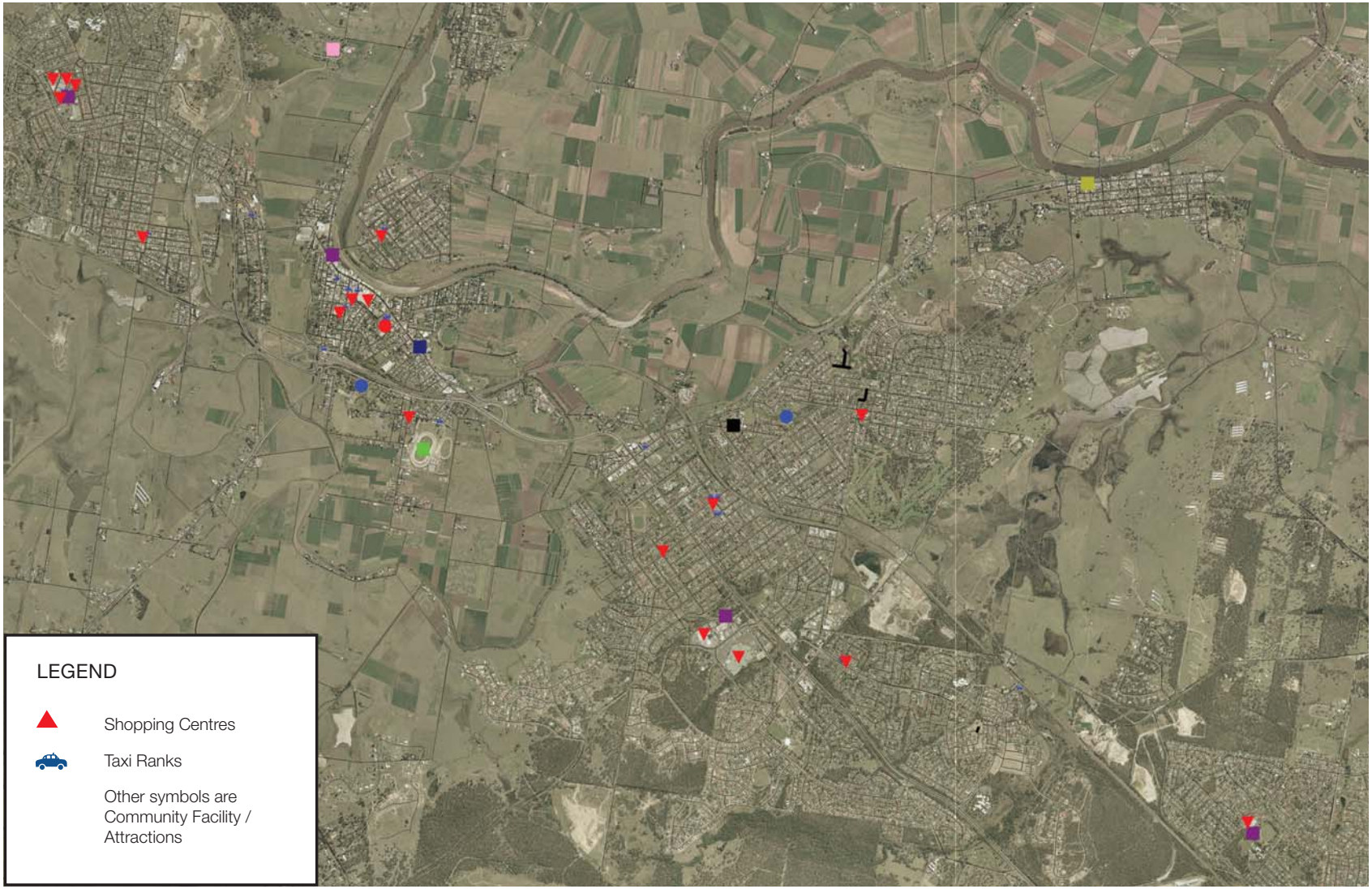
FIGURE 5.2 - TRAIN STATIONS WITHIN WALKING DISTANCE (500M)

5.2.3 Taxi

There are some 31 taxis providing services for the area with taxi ranks located throughout the study area (shown in Figure 5.3). Taxis provide a 24-hour service particularly when no regular transport services are suitable or available.

A review of all taxi ranks within the study area should be considered to reflect the required need and activities of the area.

FIGURE 5.3 - TAXI RANKS, SHOPPING CENTRES AND COMMUNITY ATTRACTIONS



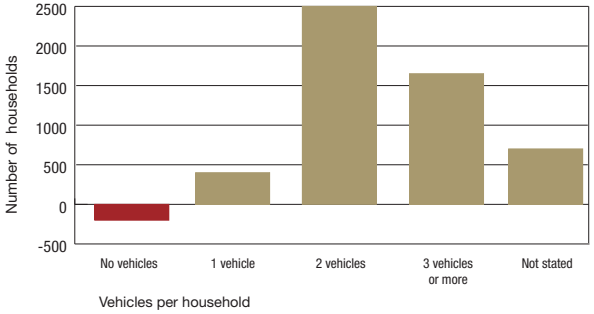
5.2.4 Strategies

It is important to fully understand the characteristics of the city and its relevant issues in order to develop appropriate public transport strategies for the area. One of the main aims of this study is to encourage strategies that are practical, achievable and area specific. It is appreciated that there is a vast amount of information and strategies available by various organisations and government agencies on how to promote a higher use of active and public transport.

This report identifies policies and actions (as detailed in Section 6.0) that are achievable with tasks that are realistic and feasible within the life of the strategy. For example, a target of 20% public transport use among Maitland residents by the year 2026 would be very welcoming news. Nevertheless, the enormity of the issue needs to be understood particularly when a city has experienced a decline of public transport use from 5.2% to 2.7% for a period between 1991 to 2006 and has a large amount of rural residential holdings. It should also be noted that the continuous population increase and higher car ownership will cause more numbers of cars on roads. The challenge however lies on how to curtail this car dependency and its environmental affects.

The policies and actions as set out in this report aims to support an integrated land use and transport strategy for the Maitland area that will be responsive to the community as a whole and all its needs for a vibrant and sustainable city. These methods include various approaches such as: **environmental** (e.g. pursing a carbon credit scheme); **cultural and behavioural** (e.g. rental bikes at train stations) and **strategic** (e.g. land use development patterns, incentive schemes, active inter-departmental dialogue).

CHANGE IN CAR OWNERSHIP, MAITLAND CITY - 1996 TO 2006 (ENUMERATED DATA)



Source: Australian Bureau of Statistics, 2006 and 1996 Census of Population and Housing (Enumerated).

5.3 Cycleways and Accessibility

There are five key principles to be considered for the development of an efficient and usable bicycle and pedestrian network. The principles and criteria are:

Coherence

- Routes should link popular destinations with residential streets via regional and local routes.
- Routes should be continuous and easy to follow.
- Routes should provide a consistent quality and facilities.
- Intersections and mid-block crossings should provide a clear path for cyclists and pedestrians.

Directness

- Routes should be as direct as safely practicable.
- Delay time should be minimised.
- The length of any detours outside the most direct route should be carefully considered.

Safety

- Road crossings and intersections present the greatest danger to pedestrians and cyclists. Safe road crossing and intersection treatments should be provided at regular and convenient locations to minimise risk of traffic conflict and accident.
- Facilities should be monitored to minimise risk of unsafe infrastructure.

Attractiveness

- The network should have community support.
- Routes should consider the attractiveness of the local environment to enhance the enjoyment of the experience.
- Users should feel the network to be safe.
- Supporting systems such as maps, signage and rest facilities should be provided to add to the attractiveness of the network.

Comfort

- A smooth and well maintained walking and riding surface is essential for the comfort and safety of users.
- Routes should consider gradients. Detours may be appropriate in steep topography.
- Routes should be as continuous as possible and minimise the need to stop.

The bicycle and pedestrian network must be available for all who choose to use it. This requires compliance with Austroads Part 13 – Pedestrians, Austroads Part 14 – Bicycles and AS1428 Design for Access and Mobility.

Council has been progressively implementing a number of strategic plans for the progressive improvement of infrastructure in the Study Area. Each of Council's current strategic plans has contributed to improvement in the safety and amenity of the bicycle and pedestrian network.

It is also envisaged that further detailed planning of pedestrian and cycle route take place as part of the preparation of local plans for each suburb.

Figure 5.5A, 5.5B and 5.5C show the pedestrian accessibility to public transport (buses) for the Maitland area. It indicates that majority of bus stops are within the walking distance. The cycle routes for the Maitland LGA is shown in Figure 5.4. It provides an overview of areas that are accessible by bikes or could be used as recreational cycle routes.

FIGURE 5.4 - CYCLEWAYS

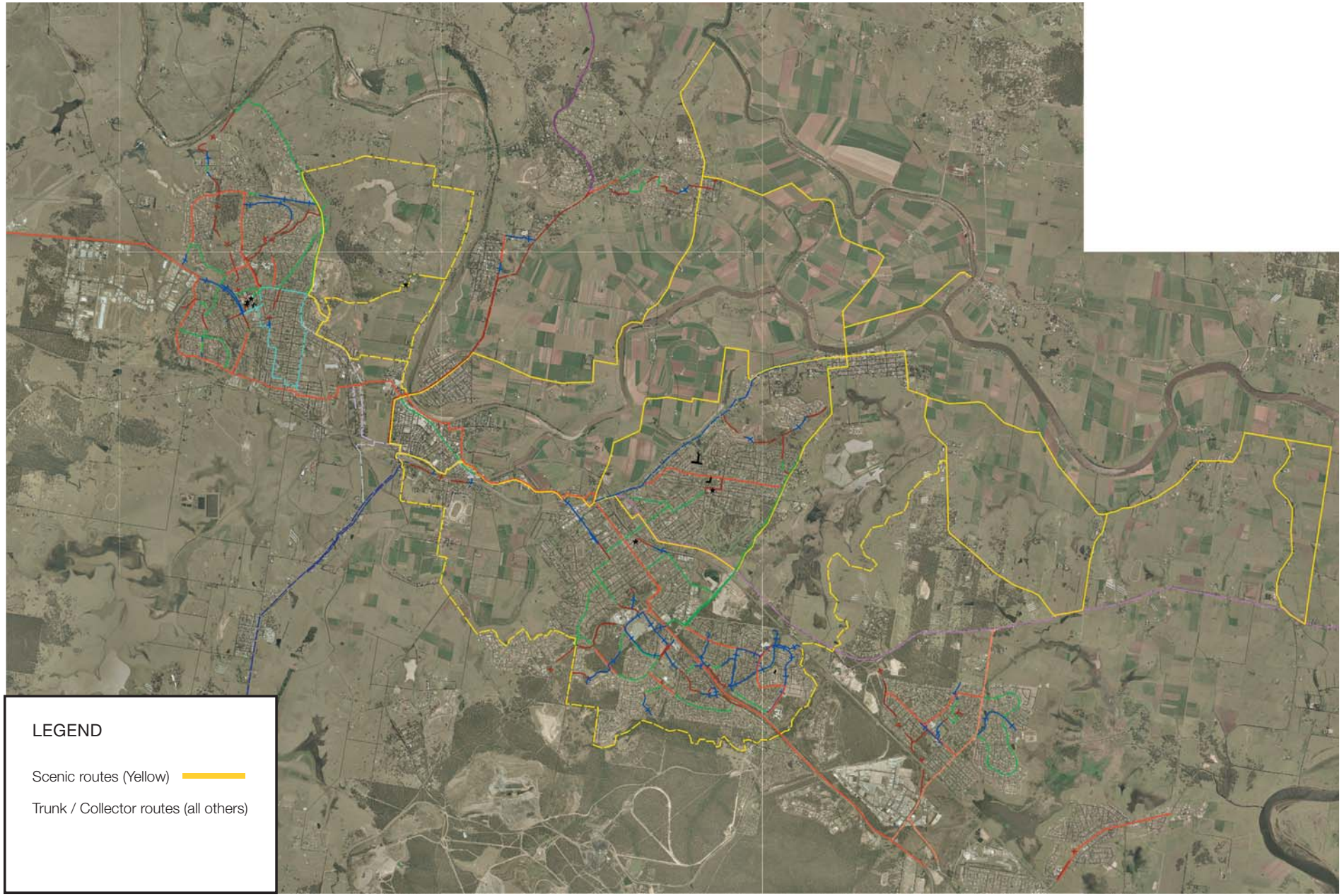


FIGURE 5.5A - BUS ROUTE & ACCESSIBILITY (WALKING DISTANCE OF 200M) - CITY WEST

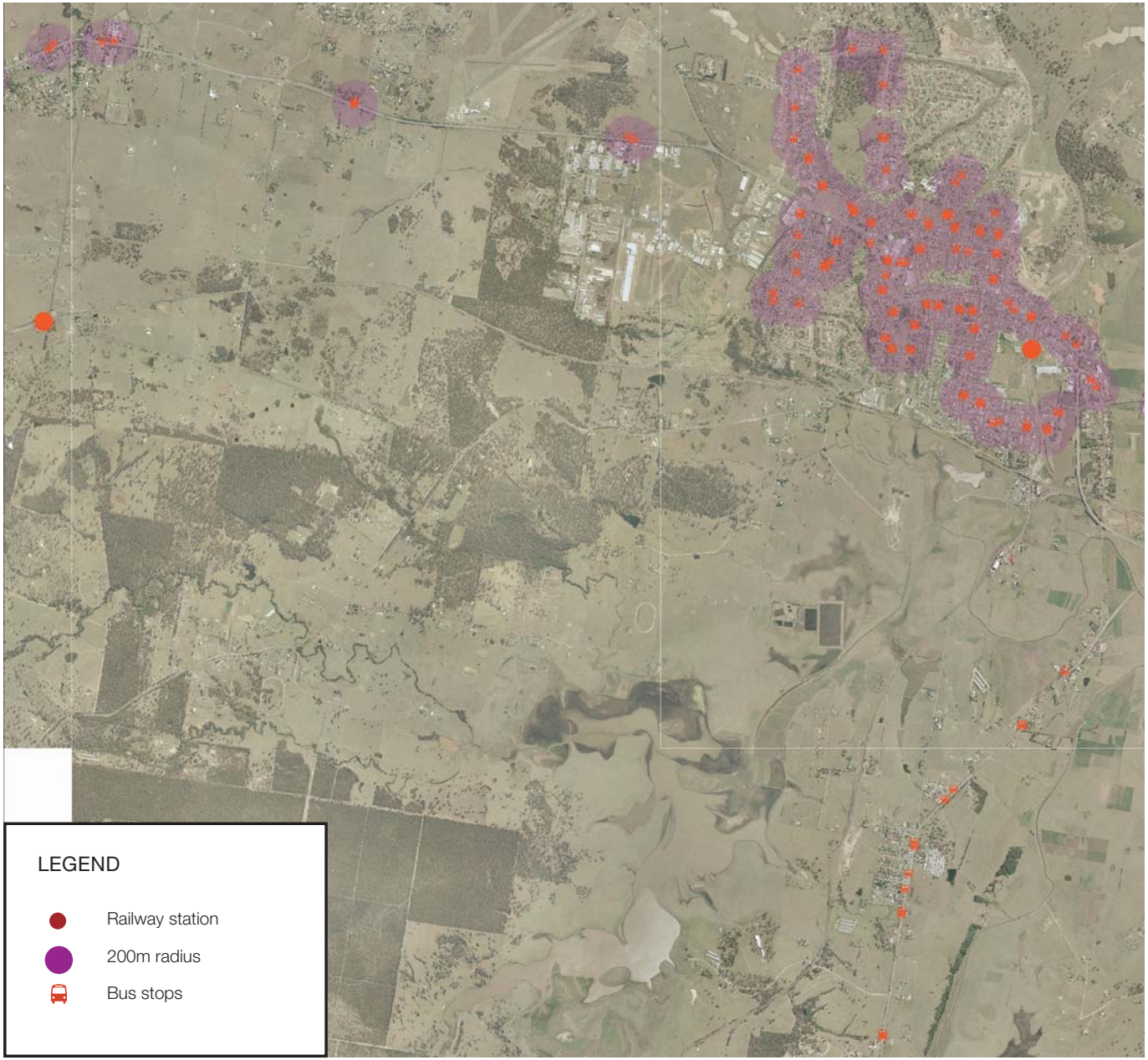


FIGURE 5.5B - BUS ROUTE & ACCESSIBILITY (WALKING DISTANCE OF 200M) - CITY CENTRAL

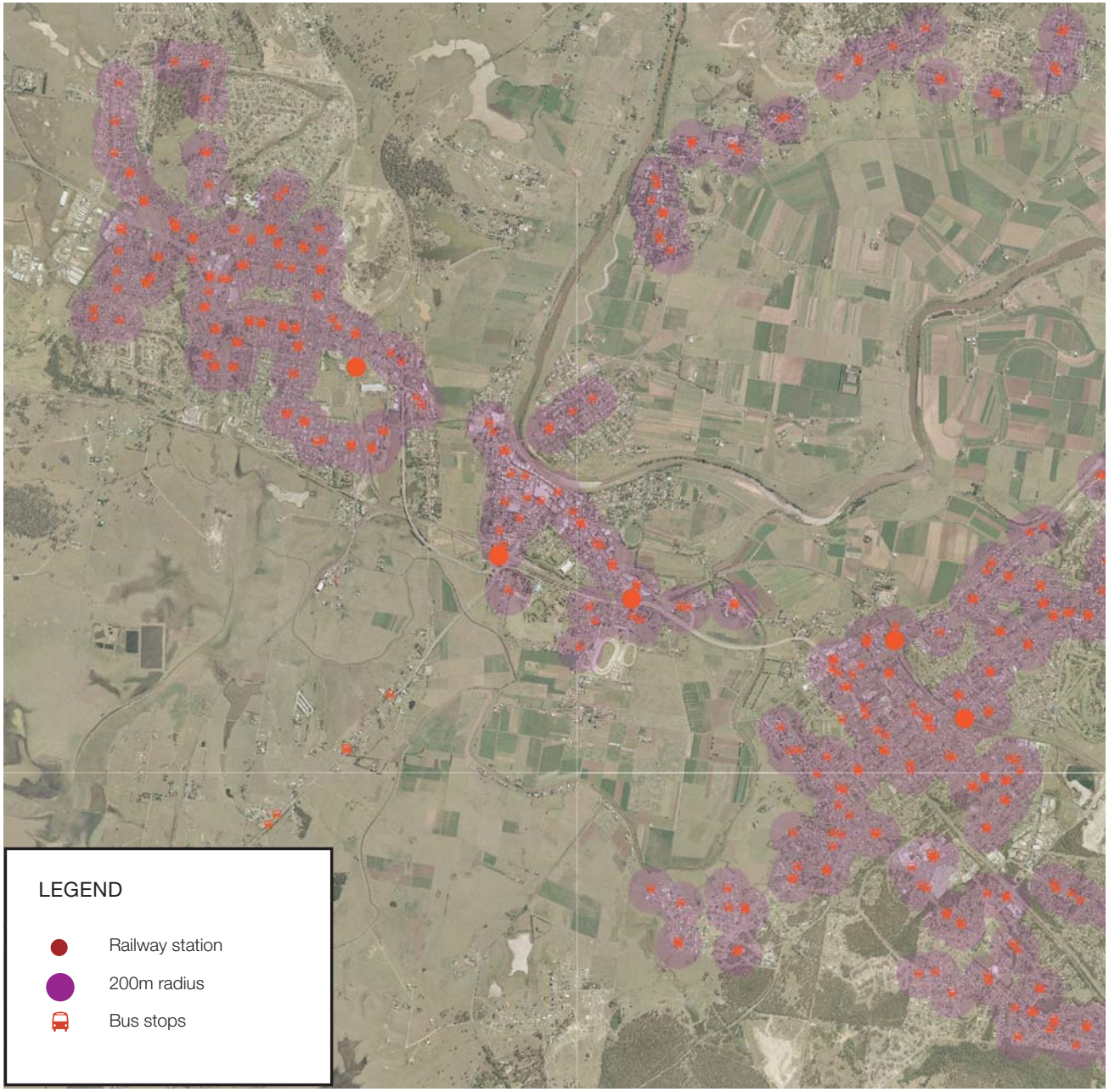


FIGURE 5.5C - BUS ROUTE & ACCESSIBILITY (WALKING DISTANCE OF 200M) - CITY EAST

5.4 Street System

5.4.1 Definition of Functional Classification of Roads

Road hierarchy is a powerful planning tool which defines the real purpose of each road in an urban area. As it is stated in the 'Updated Guidelines for Functional Classification of Roads' by the Roads and Traffic Authority (1991), the establishment of road hierarchies allows the pursuit of environmental objectives in planning of new residential areas and in modifying and protecting existing residential areas. In traffic terms, it gives recognition to making adequate provision for access to and from land uses for road vehicles, for the safe movement of pedestrians, bicycles, and for the effective operation of local public transport and parking. In summary, a functional hierarchy of roads defines whether a road is inter-regional in level (serving vehicles travelling longer distances at higher speeds); or is at local level (providing land use access and serving slower speed traffic); or a combination of both functions. In practice, a road serves more than one class of traffic movement, but the predominant use can be determined and then appropriate design standards can be selected.

The need for a review of the existing road hierarchy becomes evident by presence of traffic congestion on the arterial roads causing intrusion of through traffic into the local streets.

In the basic form, the classification of roads should give recognition to two competing goals for urban areas which are the provision of:

- reasonable living and environmental conditions, and
- reasonable mobility for movement of people and goods in road vehicles.

In development of a road hierarchy, generally four main classifications of roads are considered. These are:

Arterial Roads

Predominantly carry through traffic from one region to another, forming principal avenue of communication for urban traffic movements. Smooth and safe traffic flow is the priority in these roads. Use of Local Area Traffic Management devices is not appropriate, although larger roundabouts are suitable.

Sub Arterial Roads

These roads connect the arterial road to areas of development and carry traffic directly from one part of a region to another. This may also relieve traffic on arterial roads in some circumstances. Smooth and safe traffic flow is still the main priority in these roads. Use of typical Local Area Traffic Management devices is not appropriate in these streets.

Collector Roads

A non-arterial road which mainly collects and distributes traffic in an area as well as providing access to abutting property. It may carry some though traffic as it connects sub-arterial roads to the local road system in developed areas. Its use by heavy vehicles as a through route would not generally be appropriate.

Local Roads

These are the sub-divisional roads within a particular developed area which are used solely as local access roads. Where this class of street receives inappropriate use it could be subject to intensive treatments such as road closures, speed humps, etc to deter its use by non local traffic.

It should be noted that the construction standard of a road does not define its classification, rather it is the strategic nature of the road that determines its classification. Although obviously most roads of very high construction standards (e.g. freeways), function as arterial roads. From a technical point of view (not necessary from an environmental one) arterial roads are considered as being the highest and local roads the lowest order of classification.

The criteria for functional classification of roads for the road hierarchy should simply be based on the premise that the place of a road in the hierarchy is defined by its role in the traffic network and in the urban structure it serves; that is on the type of the traffic being served and its interaction with adjacent land uses. The classification selected for the road then helps to define the characteristics required for its implementation, such as road cross-section, geometric design and traffic management treatments.

In AUSTROADS (1988b), it is stated that "The classification of roads or streets may be based on a system of Roads Amenity Classification which recognises the role of different street users (trucks, cars, pedestrians, cyclists, public transport) and non-traffic functions of streets (landscape, play areas, service utilities)."

The factors that are considered for development of a road hierarchy fall in the following areas for each road class:

1) the length of traffic served by each road class;
2) the effect on the urban structure being served;
3) the interconnections required in the road network.

The following factors should be used as part of the development process of a road hierarchy:

a) Vehicle Speed
b) Traffic Volume
c) Traffic Composition
d) Land use
e) Intersection Spacing
f) Road Geometry
g) Traffic management, e.g. parking, intersection control, bus and transit lanes, pedestrian crossings and access and control of turning traffic.
h) Other possible factors such as local area traffic management schemes, noise impact on adjacent land use, level of service.

5.4.2 Road Hierarchy

In consideration of the above criteria combined with available information and data, existing and long term road hierarchy plans for the area have been prepared.

The available information incorporated several factors including traffic modelling projections for the year 2026 (including the proposed road network) in addition to traffic volume data and land use information in the Maitland area.

The Guidelines for Functional Classification of Roads (RTA 1991) indicates that the criteria for functional classification of roads should simply be based on the premise that the place of a road in the hierarchy is defined by its role in the traffic network and in the urban structure it serves. That is, on the type of traffic being served and its compatibility with adjacent land-uses. The classification selected for the road then helps to define the characteristics required for its implementation, such as road cross-section, geometric design and traffic management treatments.

For example, a street with a high level of traffic (say about 2000 vehicles per day) in a residential area may be classified as a local road whilst a street with similar traffic volume but within an industrial area would have a collector classification. Similarly a street with a short or limited length has been classified as a local or collector road (regardless of its level of traffic volume) while a road with a low traffic volume but a length that connects two areas or suburbs together has been designated as collector or sub-arterial road.

The proposed road hierarchy for Maitland has aimed to establish the connectivity of the area while maintaining the interaction between suburbs. Therefore, use of higher order roads such as sub-arterial has been avoided as not to create a barrier within the urban environment and neighbourhoods. The proposed road hierarchy has incorporated some of the major roads within Maitland as major collector roads such as Metford and McFarlanes Road. This measure will maintain the urban character of the area while allowing slower speed environment with better pedestrian facilities for its users. A lower level road, in terms of hierarchy, would allow more cross road activities for both pedestrians and vehicular movements providing better connectivity for the area.

The proposed road hierarchy for the existing and future road network are shown in Figures 5.6 and 5.7, respectively.

FIGURE 5.6 - EXISTING ROAD HIERARCHY

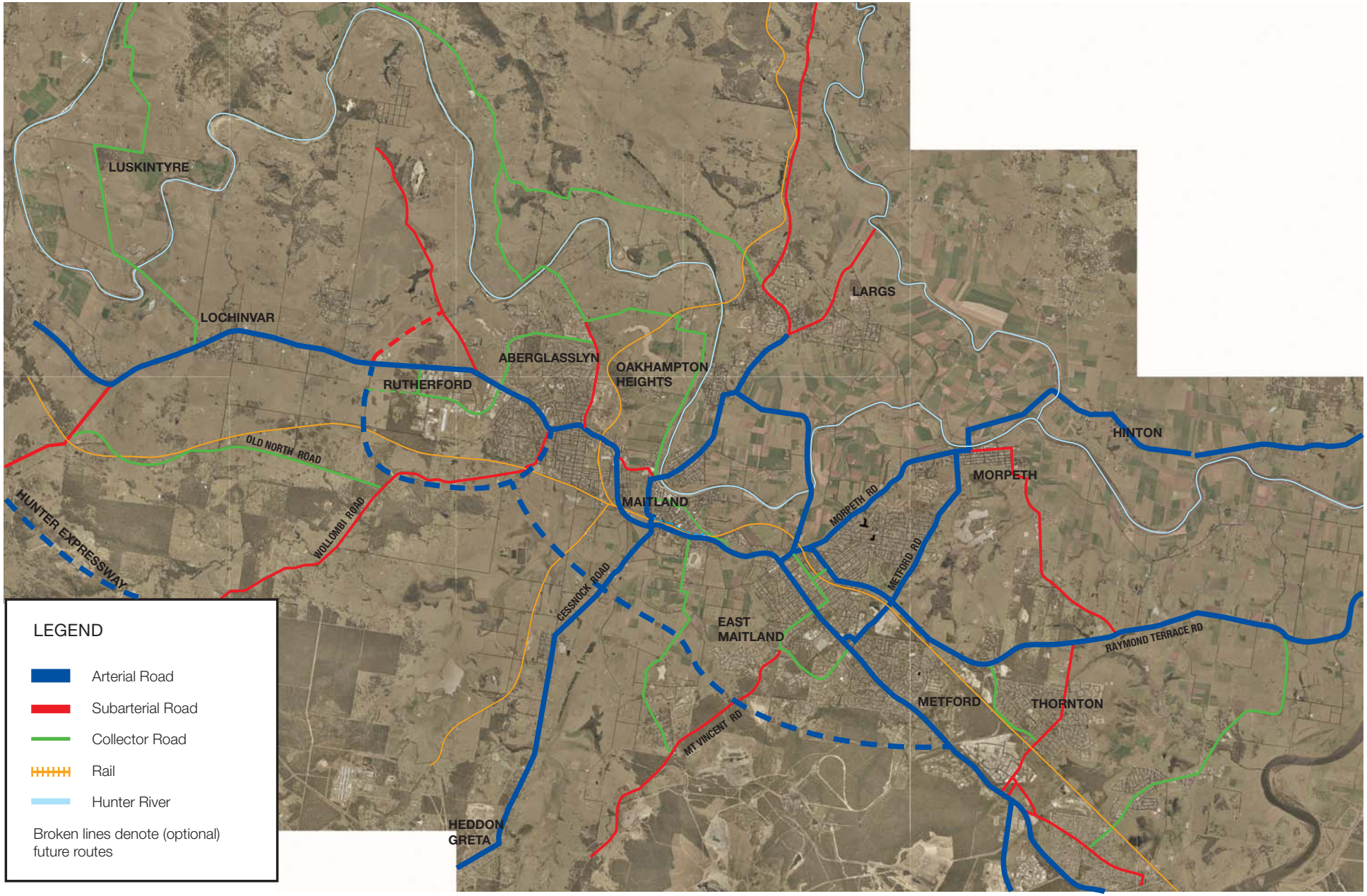


FIGURE 5.7 - FUTURE ROAD HIERARCHY

5.5 Land Use and Transport Strategy

The principles of integrating land use and transport are outlined in Section 2.1 of this report. It reveals that the desired outcomes could only be achieved when the transport solutions are combined with appropriate land use policies (such as MUSS and LHRS for the Maitland area).

In consideration with the studies findings the following land use policies are recommended as part of this integrated land use and transport study for the Maitland area (as shown in Figure 5.8).

- Encourage Infill Developments (with compact residential uses) in:
  - Thornton
  - Greenhills
  - East Maitland
  - Maitland CBD and Horseshoe Bend
  - Rutherford
  - Lochinvar
- Light Industrial Uses in:
  - West Rutherford
  - Metford
  - Thornton (southern part)
- Reinforcement of retail and bulky goods centres as shown in Figure 5.9
- Discourage over development along NEH (strip development) to reduce level congestions/use along the Highway and promote localised activities.
- Reduce over development within Greenhills area including residential uses to maintain its accessibility requirements
- Initiate schemes such as the redevelopment of Metford Train Station with a view to provide a commercial activity centre such as a supermarket or neighbourhood shopping centre with possible medium residential units at its vicinity. This could be by rezoning the existing land and exploring an access at its north side to benefit from major access roads such as Raymond Terrace Road (including a pedestrian bridge between the north and south side).

On the basis of the assessment and technical investigation, a strategy for development of the Maitland road network is proposed. The strategy includes the upgrade of New England Highway and provision of link roads (e.g. the proposed Southern Bypass) within the Maitland local government area.

The aim is that New England Highway in conjunction with its road network will be developed to further its accessibility role and provide better connectivity between communities, villages and centres.

It is also intended to facilitate accessibility including upgrading and maintenance of public transport options as part of a traffic and transport management plan. While it is regarded that train station facilities could be established along the railway line in Rutherford and Aberglasslyn, their inclusion as part of this study has not been considered. This is due to decreasing patronage along the railway line within the Maitland area and low population density of these areas. However, such provisions could be as part of a longer term strategy.

The overall transport strategy's main functions are to:

- Provide a safe and efficient road and transport access for the community.
- Ensure environmental, social and planning issues are taken into consideration.
- Support tourism and local industry.

The land use and transport access plan identifies (as shown in Figure 5.9 to 5.11):

- Major access routes to activity centres
- Potential future public transport hubs
- Possible bus interchange
- Possible new/improved train stations
- Activity Centres
- Potential infill development and industrial uses

In addition to the identified works, the following technical investigations are also proposed for consideration as part of a long term plan for the area:

- Use of the latest technology such as "real time table" for buses at Transit Zones or shopping centres.
- Establishment of a Train Station at Lochinvar per its Structure Plan.
- Encourage multi-modal travel as a complementary mode to bus and train travel (such as maintaining the existing commuter parking at train stations).
- Consideration for a public transport hub in Rutherford.

FIGURE 5.8 - LAND USE STRATEGY

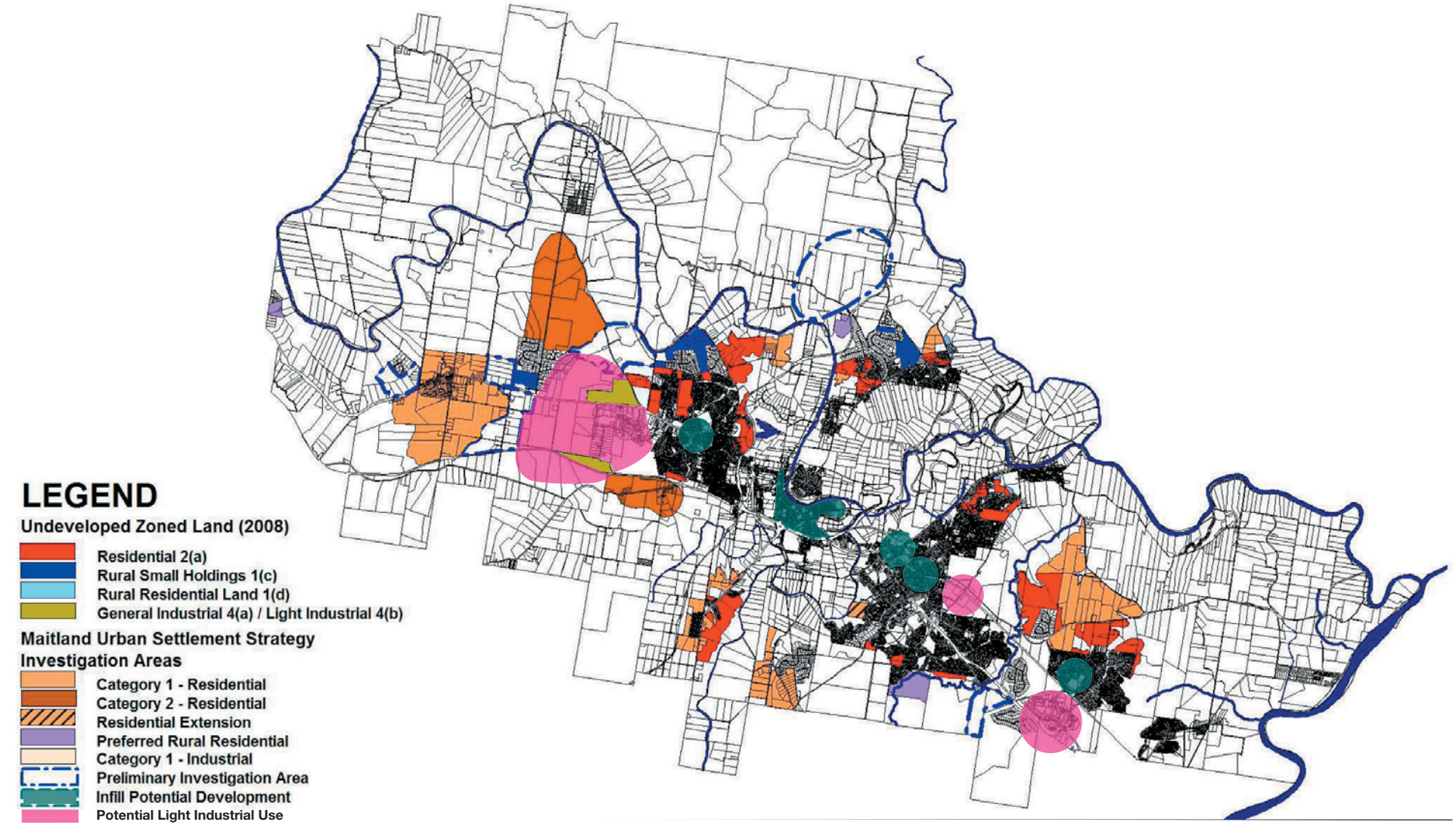
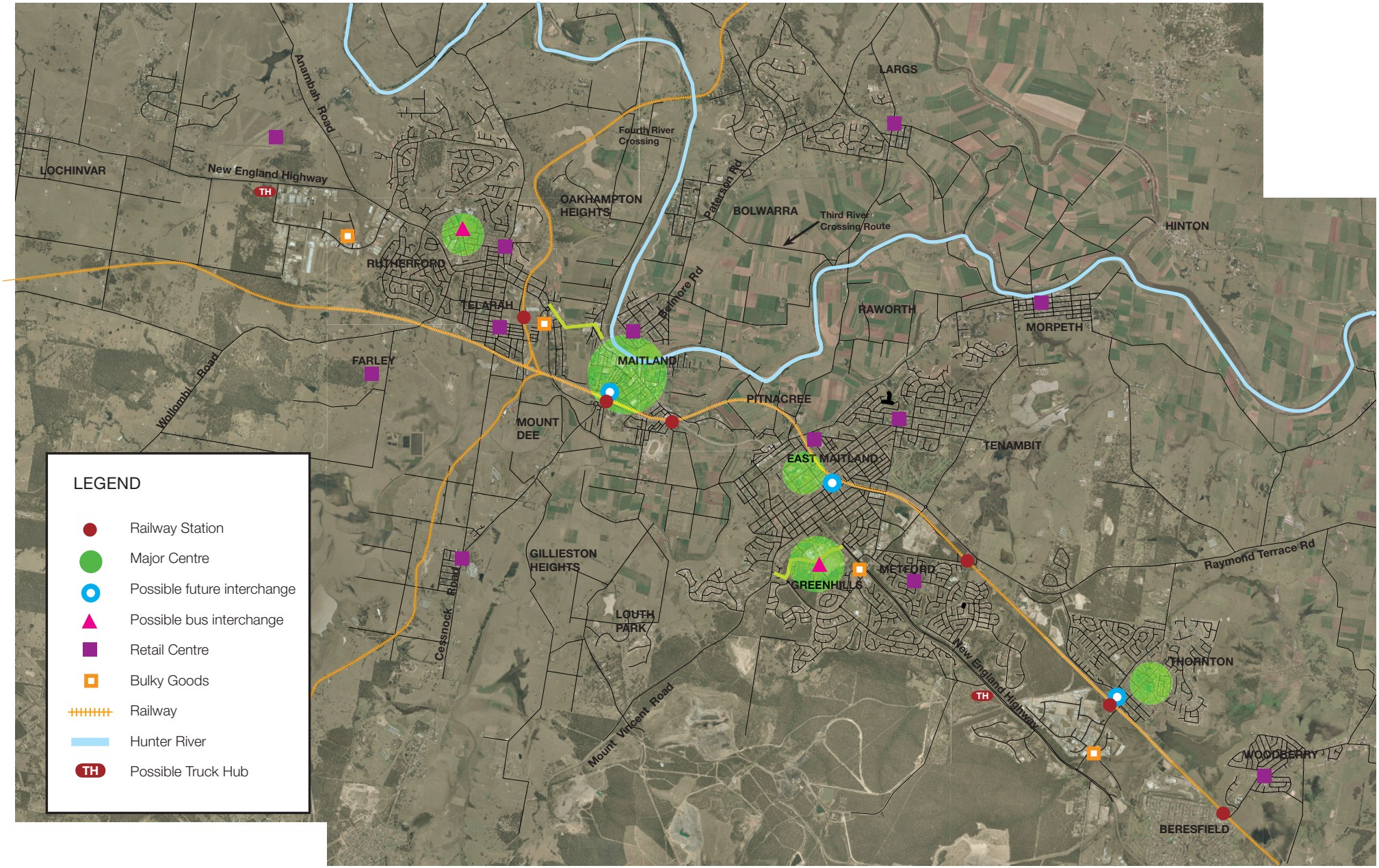


FIGURE 5.9 - ACTIVITY CENTRES AND TRANSPORT HUBS



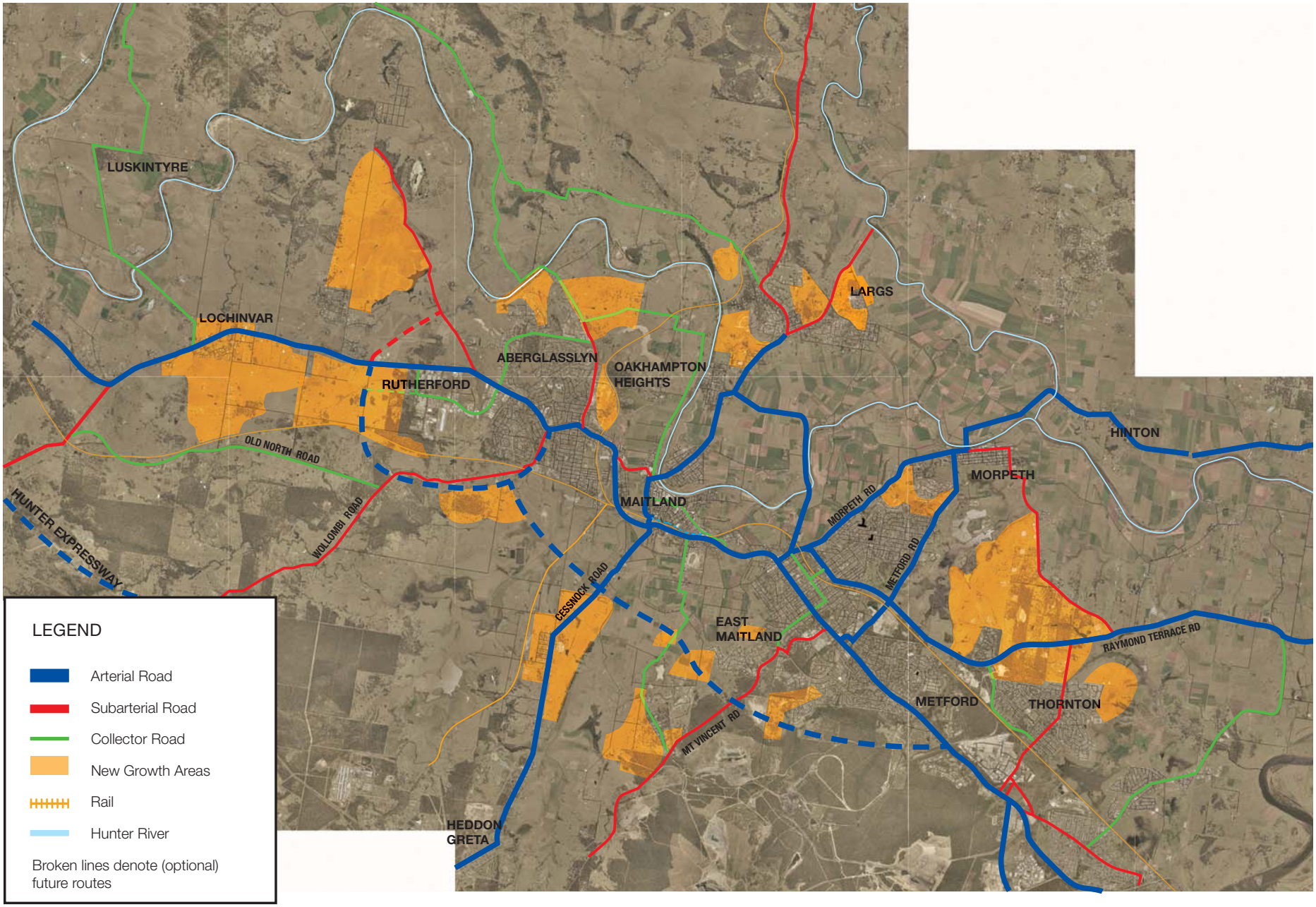
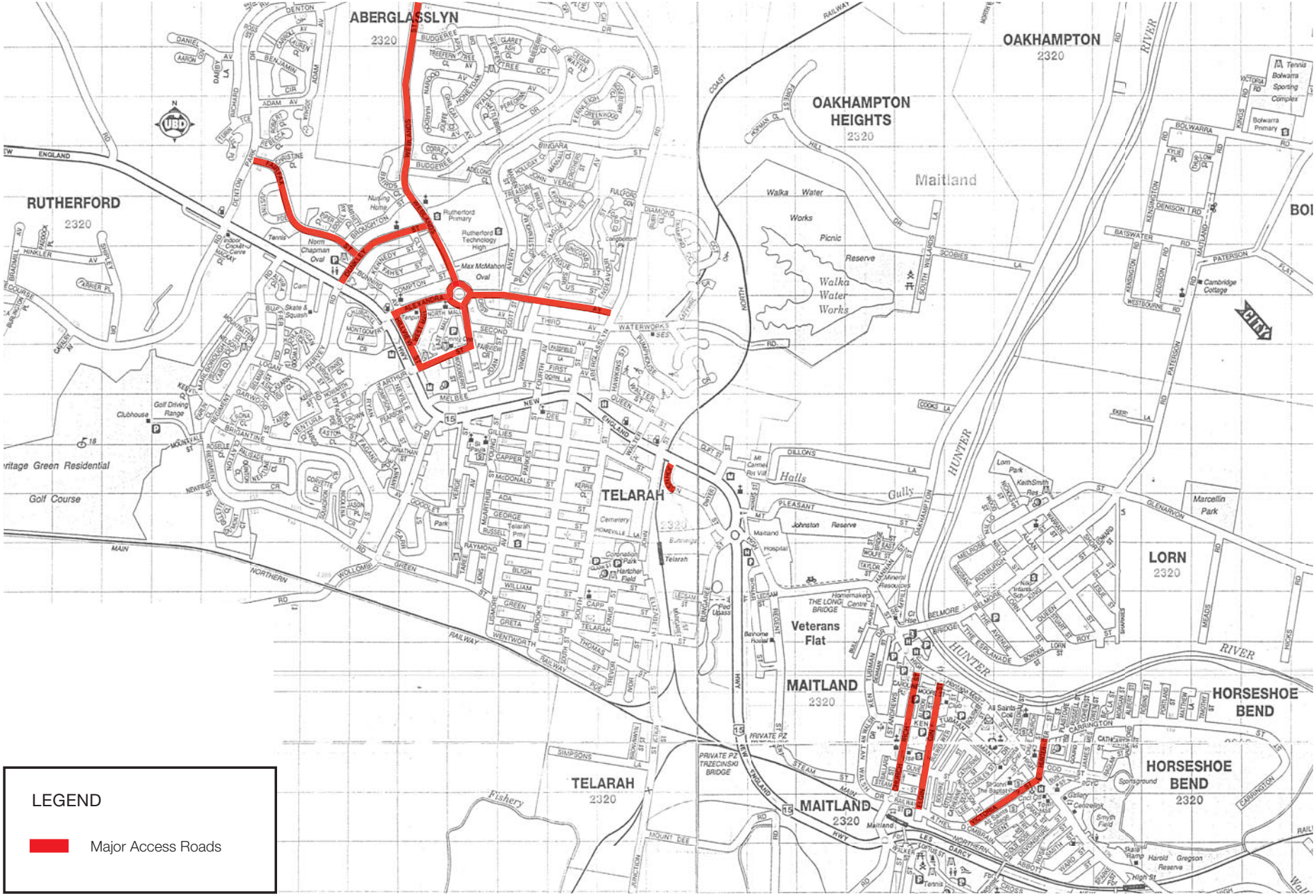


FIGURE 5.10 - MAJOR ROUTES TO NEW GROWTH AREAS

FIGURE 5.11A - ACCESS ROUTES TO ACTIVITY CENTRES - CITY WEST



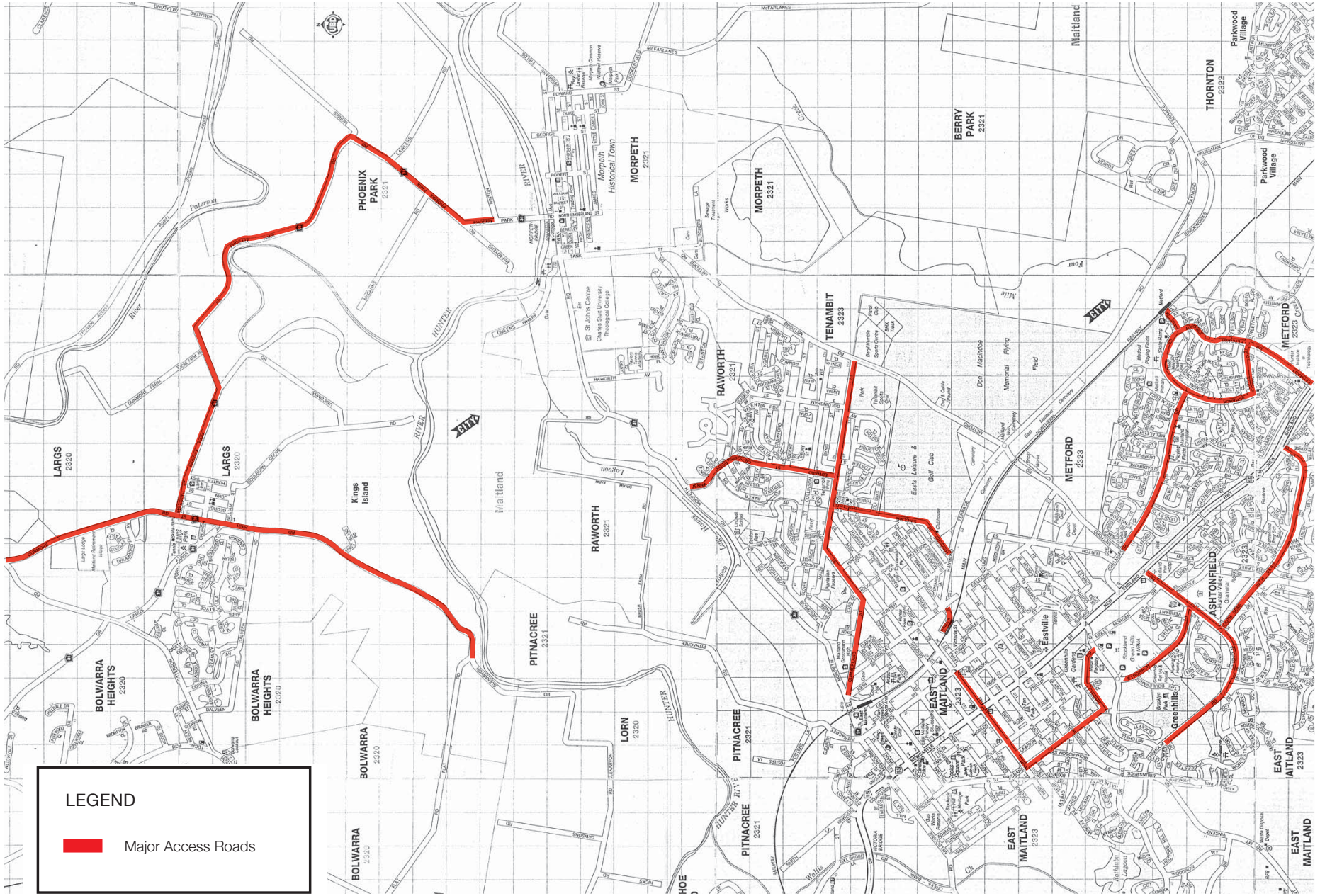
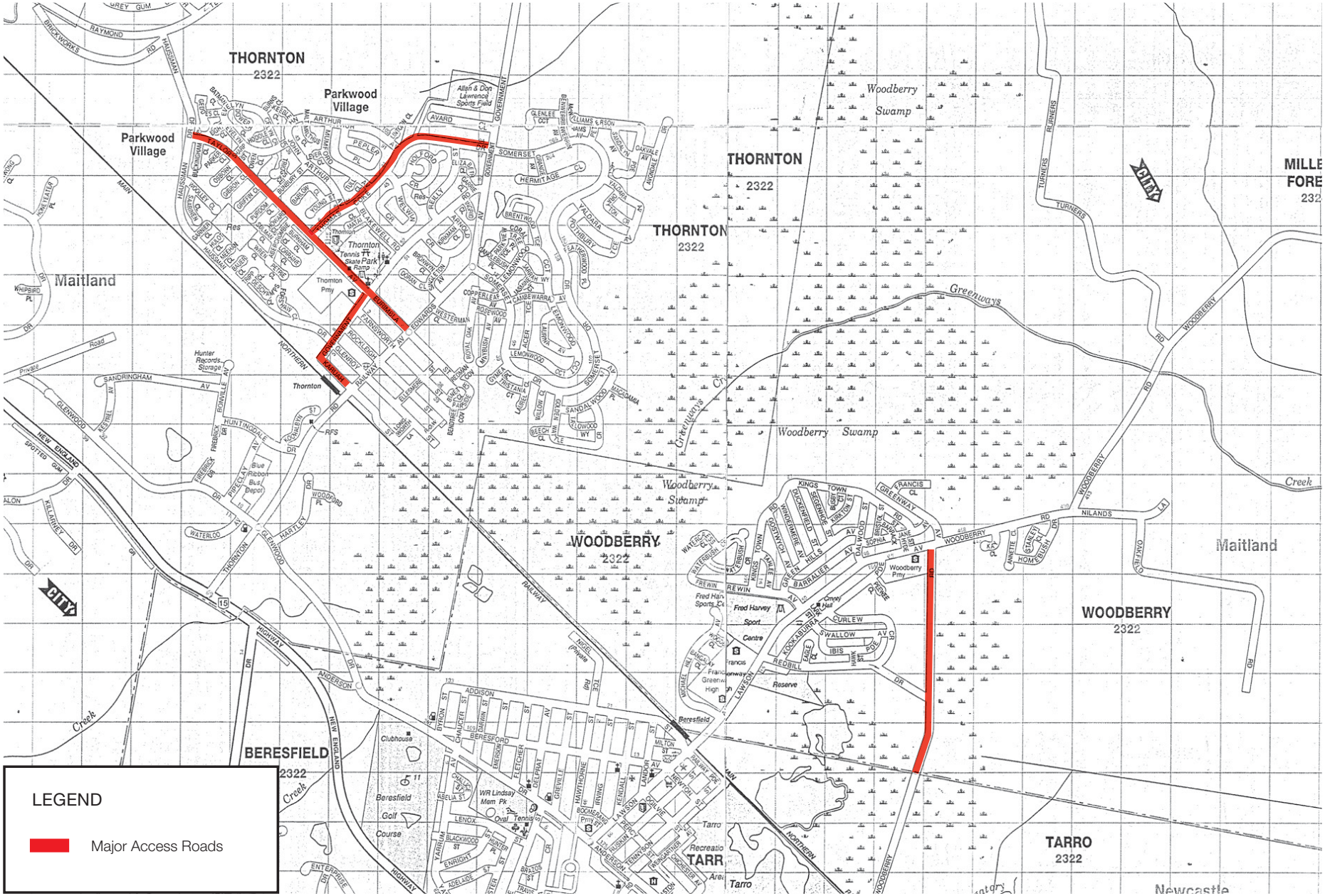


FIGURE 5.11B - ACCESS ROUTES TO ACTIVITY CENTRES - CITY CENTRAL

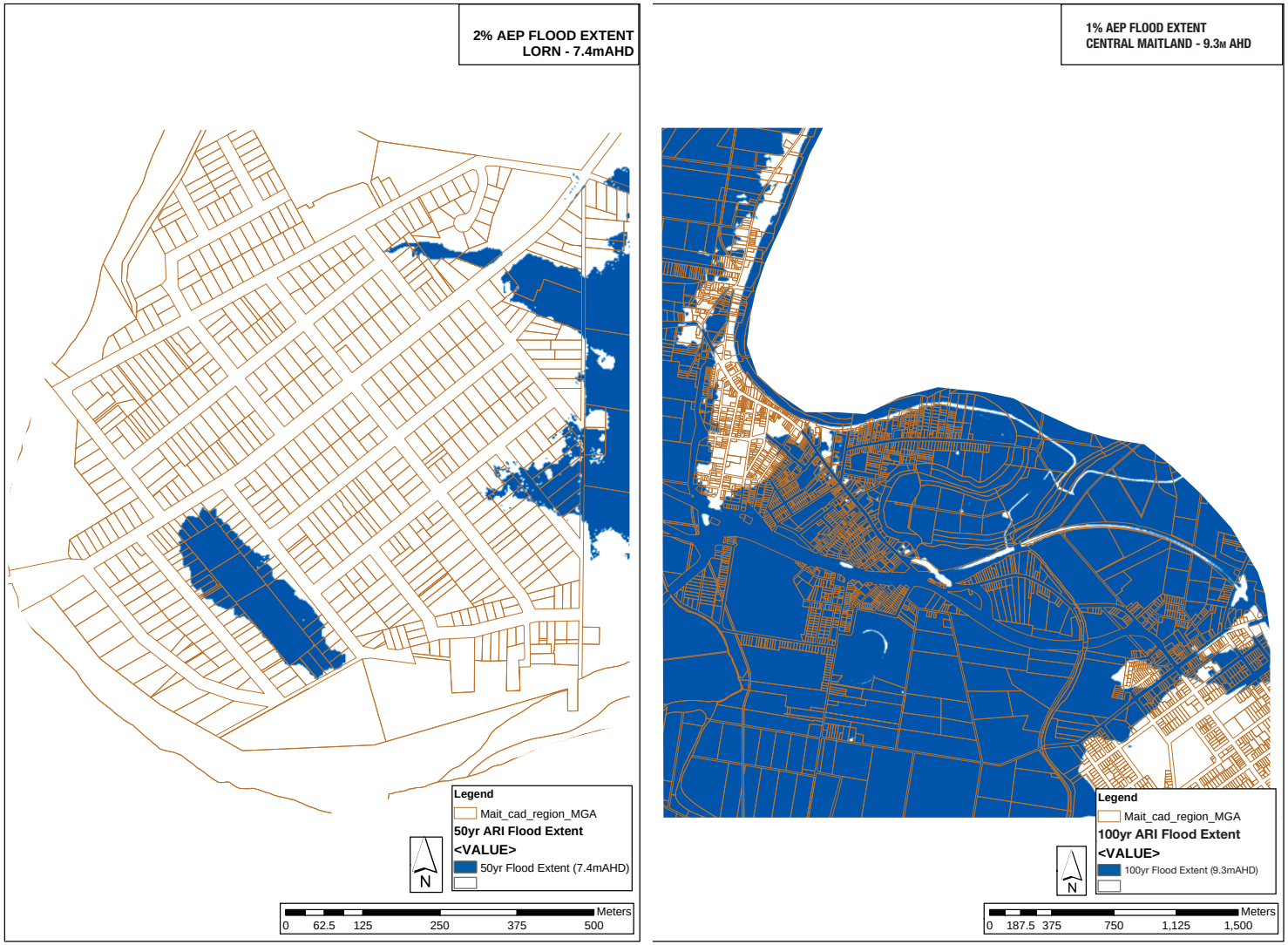
FIGURE 5.11C - ACCESS ROUTES TO ACTIVITY CENTRES - CITY EAST



5.6 Flood Evacuation Plan

Flooding of developed land from the Hunter River poses an ongoing risk to residents of Maitland, particularly those living in low areas that rely on the Maitland Flood Mitigation Scheme for protection against inundation of floodwaters. The flood mitigation scheme cannot be relied upon to provide protection against all levels of possible flood nor is it guaranteed not to fail through means other than by overtopping of levees.

The SES Maitland Local Flood Plan details the general arrangements and responsibilities of authorities including the State Emergency Service in the event that evacuation of residents becomes necessary during severe floods. The Maitland City SES Local Controller has the responsibility and authority for issuing any general evacuation order during flooding and as far as possible, evacuation is carried out before inundation occurs. The Local Flood Plan also lists operational sectors for the purpose of managing flood response operations as well as the conduct for evacuations, including possible evacuation routes and centres. These possible evacuation routes are generally shown Figure 5.13 and only remain operational until being closed depending upon the level of floodwaters. Figure 5.13 also identifies road sections that could be considered for investigation of upgrading to establish a "flood free route" out of central Maitland or at least to improve the reliability of these possible evacuation routes because of existing topographical and built environment constraints.



Source: Maitland City Council

FIGURE 5.12 - 1%-2% AEP FLOOD EXTENT

FIGURE 5.13 - POSSIBLE FLOOD ROUTES - EVACUATION PLAN

6.0 POLICY AND ACTIONS

6.1 Overview

The principles of integrated land use and transport planning are detailed in Section 2 of this report. This section details proposed measures, policies and actions that address these principles as the planning tools for future land use and transport management in Maitland.

Proposed road network improvements such as provision of a Southern Bypass route aim to ensure that road infrastructure will meet current and future needs of the area. Such measures will ensure more efficient and safe movement of vehicular traffic throughout the road system.

The proposed road hierarchy (including major access routes) provides a guide for establishment of key routes between existing and future land development areas and major attractors such as shopping centres.

The "Flood Routes – Evacuation Plan" illustrates possible evacuation routes for residents within the Maitland area during flood emergency situations. The plan also identifies road sections that could be considered for investigation of upgrading to establish a "flood free route" out of central Maitland.

The proposed transport and land use plan includes possible interchange locations in population growth areas. The plan aims to integrate movements and is a strategic response to the future needs and challenges of the city in order to maintain a high quality of life for the community. This is supported by a bike plan that also caters for recreational activities.

Accordingly, the following policies, actions and implementation plans are suggested in order to achieve the desired objectives.

6.2 Policies

Objective 1: Strategic: Balanced Land Use Planning and Accessibility for the City.

Policy 1.1: Transit and Pedestrian Oriented Development:

Within targeted infill development areas (as noted in MUSS), ensure development is clustered near railway stations and along major corridors served by bus routes thereby creating transit-oriented development "nodes" and encouraging pedestrian access.

These could be supported by medium density housing and commercial developments:

- along Athel D'Ombrain Drive in Maitland Central Area, Victoria Street and East Maitland.
- in proximity to Greenhills Shopping Centre
- within the Thornton North development area
- surrounding the Metford Train Station
- as part of the Rutherford investigation areas; and
- in Lochinvar area as identified in its Structure Plan.
- Behind the main street where medium density has been identified as environmentally appropriate (eg. addressing the river and with specific height, form, massing etc. controls)

Policy 1.2: Traffic Circulation:

Maintain a road system with less congestion and delays that would have a positive impact on the environment as well as viability of the City. Re-establishment of main corridors with connections to main development areas and public transport hubs:

- Implementation of road strategies (i.e. widening and improvements) as outlined in Access Plan
- Intersection upgrades as identified in Access Plan
- Consideration of road network proposals such as the proposed Southern Bypass for implementation
- Continue to engage in active dialogue with governmental agencies for appropriate funding to address issues in response to regional growth and its required movement activities

Policy 1.3: Localised Access Plan:

Develop localised accessibility plans that will address connectivity and linkage between schools, shops, public transport and major transport corridors. The access plan should include all modes of transport including pedestrian, bicycle, cars and public transport for a short and, particularly, long term when population increases. These would be very relevant to new major centres such as Greenhills, Thornton North, Rutherford and Lochinvar.

Policy 1.4: Neighbourhood Centres:

Encourage the provision of services that serve residents within walking distances of homes.

Objective 2: Environment: Towards an Environmentally Friendly City

Policy 2.1: Public and Active Transport Initiatives:

Devise a series of active/public transport strategies to encourage less car-dependent modes of transport. These include:

- Introduction of incentive schemes within private and public sectors where employees who do not use cars, as their mode of transport to and from work, would be entitled to a bonus such as annual public transport ticket; a bicycle or cash rebate.
- Rate or tax incentives to employers who provide shuttle buses for their employees or put forward active/public transport incentive schemes.
- Rate/tax incentives for developments that are near railway stations or major public transport hubs.

Policy 2.2: Carbon Trading Scheme:

Consider investigating avenues for carbon sequestration schemes that are financially viable for the City through:

- Allocation of flood lands for plantation while maintaining the rural nature and aesthetic of Maitland
- Development of a scheme that could potentially generate revenue for Council as part of a Carbon Trading Scheme.

Policy 2.3: Clean Car Care Program:

Investigate programs that will encourage the use of hybrid and more fuel efficient vehicles. Council or other public and private organisations could introduce such cars as part of their fleets with lower charge rates among employees who are eligible to use such a vehicle.

Objective 3: Lifestyle: Quality Living for the Community

Policy 3.1: Education:

Develop educational and awareness programs among the community to convey:

a) how good it is to live in Maitland in terms of lifestyle as well as to enjoy its natural and heritage assets;

b) how important it is to preserve and enhance the Maitland LGA and its attributes, and

c) how essential it is to lead a healthy life to enjoy the best of Maitland by having an active and environmentally responsible lifestyle.

Policy 3.2: Bicycle Support:

Council has already prepared a Bike Plan for the LGA and is actively promoting cycleways through the new and existing areas. Further initiatives, however, are required to encourage more use of bikes within the community. These could be achieved by various methods including:

- Provision of bicycle racks throughout the LGA at appropriate locations.
- Initiate a bicycle rental service at major areas such as major train stations or shopping areas.
- Allocate a special day of each month for schemes such as “Bike and Shop” or “Bike Night” where certain streets are closed to traffic and people with their families are encouraged to bike or skate freely throughout the area.

Policy 3.3: Bus Use:

Buses play an important role as part of the Maitland’s transport system. They are the main provider of transport to schools and people with no access to cars. Efforts should be made to encourage a “bus culture” within the community. This could be supported by a number of measures such as:

- Creation of transport hubs with easy access and transfer to and between buses at designated locations per Access Plan.
- On going dialogue with bus operators and relevant bodies (e.g. Rail Corp and Ministry of Transport) to address relevant issues. This could be achieved by setting out a committee to meet every say three/four months to discuss various issues such as co-ordinated time-table between bus services and train arrivals and departures.
- Introduction of special bus services such as “Beach Bus”: a service that could be operational during summer holiday season by taking people or mainly youth to nearby beaches. The service could pick up passengers at three or four major locations during a morning period and bring them back in the afternoon. An appropriate fee will be attract such services.
- Introduction of a “Holiday Ticket” scheme for school students. By a one-off payment for the purchase of a ticket, students could be allowed to use buses during their school holidays. This minimises the inconvience of buying a ticket every day or needing to have the appropriate change.

Policy 3.4: Pedestrian Access:

Encourage clear, direct and comfortable pedestrian access to main activity centres such as shops, parks, schools and transit stops. Accordingly, the provision of good illumination and shelter at transit stops should be included as part of the Pedestrian Access and Mobility Plans that Council is already pursuing.

Policy 3.5: e-Life :

Consideration should be given to encouraging people to work at home using internet and emailing facilities if such situations are possible. This would reduce journeys to and from work with, potentially, higher productivity. Public and private organisations would need to take an active role in the development of such a scheme.

6.3 Infrastructure Plan

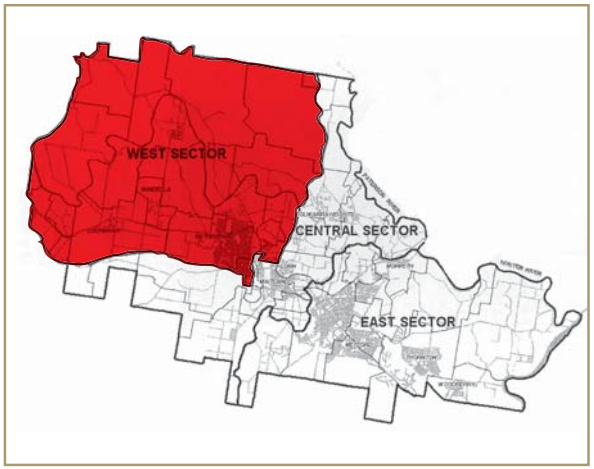
In order to meet the requirements of the proposed plans and objectives of this study, the following works are recommended for consideration and implementation. The proposed infrastructure plan aims to put forward a works program that are achievable, cost conscience and would meet the demand of community within the available resources.

City West

The Western Sector comprises the area to the west of Maitland and southwest of the Hunter River. The district covers the suburbs of Telarah, Rutherford, Aberglasslyn and Lochinvar.

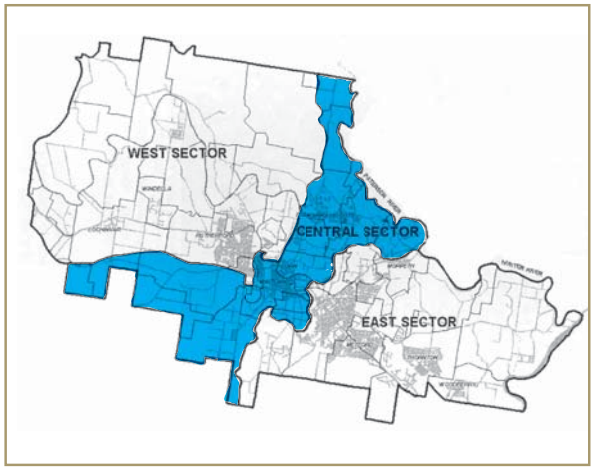
Within the study area, there is a large investigation area for employment opportunities at Rutherford. Commercial growth is expected within Rutherford and Lochinvar, with the existing commercial areas proposed to expand to cater for population growth.
A small growth is also expected in agricultural jobs in the rural areas within the western sector.

The required works/measures are clearly identified as part of the current structure/master plans for Lochinvar and Aberglasslyn areas.



City Central

The Central Sector comprises urban settlements north and south of Central Maitland. The district includes the villages of Gillieston Heights, Lorn, Bolwarra and Largs. The Maitland part of this area is covered as part of the CBD Study (i.e. ILUTS Part 2).



City East

The Eastern District comprises the entire area east of the floodplain corridor which starts at East Maitland. East Maitland is experiencing a high level of growth and activities.

The introduction of Third River Crossing, Weakleys Interchange, Thornton North Development and expansion of Greenhills shopping centre, are among a number of major projects that are currently eminent in the area. Most of the above projects such as the master plan for the Thornton North development have already identified major planning and infrastructure requirements for the area. Therefore, the proposed measures as part of this study are in line with such proposals.

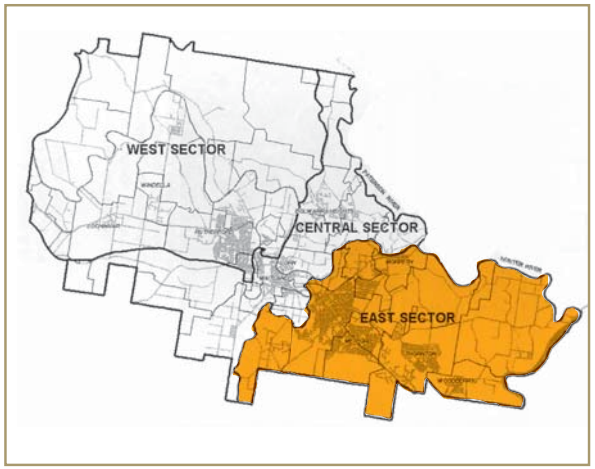


Table 6.1: Proposed Works - City West

CITYWIDE ACCESS MANAGEMENT PLAN				
CITY WEST				
	LOCATION	**SECTION**	**PROPOSED WORKS**	**COMMENTS**
Farley/Rutherford				
ECW1	Southern Bypass	New England Highway at Four Mile Creek Road to New England Highway at Rutherford	New route: a two lane road with shoulders and reserved area to accommodate a 4 lane road in future as required	To improve route network capacity per area scheme.
W1	Wollombi Road	New England Highway to Southern Bypass	Upgrade to provide four traffic lanes	To improve route network capacity per area scheme.
W2	New England Highway	At Wollombi Road	Install traffic control signals	To improve route network capacity per area scheme.
W3	Wollombi Road	At railway underpass	Upgrade underpass	To improve route network capacity per area scheme.
W4	Southern Bypass	At Wollombi Road (East)	Install traffic control signals	To improve route network capacity per area scheme.
W5	Southern Bypass	At Wollombi Road (West)	Install traffic control signals	To improve route network capacity per area scheme.
W6	Southern Bypass	At New England Highway	Install traffic control signals	To improve route network capacity per area scheme.
W7	Anambah Link Road	New England Highway to Anambah Road	New route: a two lane road	To improve route network capacity per area scheme.
W8	Anambah Road	At Anambah Link Road	Install roundabout	To improve route network capacity per area scheme.
W9	New England Highway	Harvey Road to Allandale Road	Upgrade to four traffic lanes	To improve route network capacity per area scheme.
W10	Aberglasslyn Road	New England Highway to Denton Park Drive	Route upgrade: a two lane road	To improve route network capacity per area scheme.
W11	Aberglasslyn Road	At Denton Park Drive	Install roundabout at development of Oakhampton Heights	To improve route network capacity per area scheme.
W12	New England Highway	At John Street	Install traffic control signals	To improve route network capacity per area scheme.
W13	New England Highway	At Young Street	Install traffic control signals	To improve route network capacity per area scheme.

High Priority **Medium Priority** **Low Priority**

Table 6.2: Proposed Works - City Central

CITYWIDE ACCESS MANAGEMENT PLAN				
CITY CENTRAL				
	LOCATION	**SECTION**	**PROPOSED WORKS**	**COMMENTS**
South Maitland				
ECW1	Southern Bypass	New England Highway at Four Mile Creek Road to New England Highway at Rutherford	New route: a two lane road with shoulders and reserved area to accommodate a 4 lane road in future as required	To improve road network capacity/operation.
C1	Southern Bypass	At Cessnock Road	Install traffic control signals	To improve road network capacity/operation.
C2	New England Highway	At Louth Park Road	Install traffic control signals	To improve road network capacity/operation.
Maitland				
C3	New England Highway	At Cessnock Road/Church Street	Modify existing roundabout to provide left turn slip lane from Church Street approach into the New England Highway eastbound carriageway and close Walker Street approach to roundabout.	To improve intersection operation.

High Priority **Medium Priority** **Low Priority**

Table 6.3: Proposed Works - City East

CITYWIDE ACCESS MANAGEMENT PLAN				
CITY EAST				
	LOCATION	**SECTION**	**PROPOSED WORKS**	**COMMENTS**
Thornton/Thornton North				
E1	Thornton Road and Railway Avenue Thornton	New England Highway to Glenroy Street	Upgrade to provide four traffic lanes	To improve capacity.
E2	Thornton Road Thornton	At Glenwood Drive	Remove roundabout and install traffic control signals (at Stage 2 development of Thornton North)	Thornton North development proposal.
E3	Thornton Road/Railway Avenue Thornton	Bridge over railway	Replace and/or widen bridge to provide four traffic lanes	To improve capacity per E1.
E4	Karuah Street Thornton	At Railway Avenue	Road closure and install cul de sac	Road safety. Access off Haussman Drive (see E7).
E5	Railway Avenue Thornton	At Glenroy Street	Install traffic control signals	To cater for both traffic and pedestrian needs.
E6	Glenroy Street Thornton	Railway Avenue to Government Road	Provide four traffic lanes	To improve capacity.
E7	Haussman Drive Thornton	At Government Road	Install traffic control signals	To improve access to Thornton Station (see E4).
E8	Haussman Drive Thornton	Government Road to Raymond Terrace Road	Upgrade to provide four traffic lanes	To improve capacity.
E9	Haussman Drive Thornton	At Taylor Avenue	Install roundabout	To improve intersection operation.
E10[1]	Raymond Terrace Road	Metford Road to City Boundary	Upgrade to provide four traffic lanes	To improve capacity.
E11	Raymond Terrace Road	At Government Road	Install traffic control signals (at Stage 2 development of Thornton North)	Thornton North study.
E12	Raymond Terrace Road	At Haussman Drive	Install traffic control signals	Thornton North study.
E13	Raymond Terrace Road	At proposed northern access to Metford Station	Install traffic control signals	New intersection. Access provision to railway station (all traffic).
E14	New England Highway	Thornton Road to Four Mile Creek Road	Upgrade to provide six traffic lanes	To improve capacity.
ECW1	Southern Bypass	New England Highway at Four Mile Creek Road to New England Highway at Rutherford	New route: a two lane road with shoulders and reserved area to accommodate a 4 lane road in future as required	To improve road network capacity/operation.
E15	New England Highway	At Southern Bypass	Install traffic control signals	New intersection.
E16	Southern Bypass	At Mt Vincent Road	Install traffic control signals	New Intersection.
Metford/East Maitland				
E17	New England Highway	At Ferraby Drive	Install traffic control signals	To provide safe right turn movements.
E18[2]	Proposed ext. of Chelmsford Dr	New England Highway to Molly Morgan Drive	New route	To improve access and circulation around G/Hills shopping centre.
E19[2]	New England Highway	At Chelmsford Drive	Modify traffic control signals to provide a four way junction	In conjunction with E18.
E20[2]	Molly Morgan Drive	East of proposed extension of Chelmsford Drive	Road closure and cul de sac	To separate residential and commercial traffic.
E21[2]	Mitchell Avenue	At Molly Morgan Drive	Remove roundabout and reinstate central median in Mitchell Avenue with right turn lane into Molly Morgan Drive. No right turn permitted out of Molly Morgan Drive.	To separate residential and commercial traffic and improve traffic movements and reduce queues.
E22[2]	Mitchell Drive	Mid-block between Stronach Avenue and Garnett Street	Remove the marked foot crossing and install traffic control signals at the entry to Greenhills Shopping Centre. Pedestrian phases at the traffic signals to replace the MFC.	To improve access and safety for vehicles and pedestrians.
E23	Mitchell Drive	At Stronach Avenue	Modify the north-east entry carriageway to the roundabout to provide two traffic lanes	To improve operation of roundabout.
E24	Mitchell Drive	At Chisholm Road	Intersection realignment to give priority to Mitchell Drive	To give intersection priority to the major local road.
E25	Mt Vincent Road	At Chisholm Road/Brunswick Street	Install roundabout	To provide more efficient and safer vehicular turning movements.
E26	Brunswick Street	At Richardson Street	Intersection realignment to give priority to Brunswick Street	To rationalise traffic movements bet. East Maitland & Green Hills.
E27	Brunswick Street	At Brisbane Street	Install roundabout	Part of proposed area scheme per E26.
E28	New England Highway	At Brunswick Street	Install traffic control signals	Part of proposed area scheme per E26.
E29	New England Highway	At Victoria Street	Close central median	Part of proposed area scheme per E26.
E30	Brisbane Street	At High Street	Install roundabout	To improve intersection operation.
E31	Brunswick Street	At Lawes Street	Install roundabout	Part of proposed area scheme per E26.
E32	High Street	At Lawes Street	Change traffic control signals to a scrambled crossing	To improve pedestrian safety.
Tenambit				
E33	Morpeth Road	At Jenna Drive	Install roundabout	To improve intersection operation.

High Priority **Medium Priority** **Low Priority**

1 Staged upgrading as part of Thornton North development

2 Subject to the Green Hills shopping centre redevelopment plan

FIGURE 6.1 - CITY WEST

FIGURE 6.2 - CITY CENTRAL

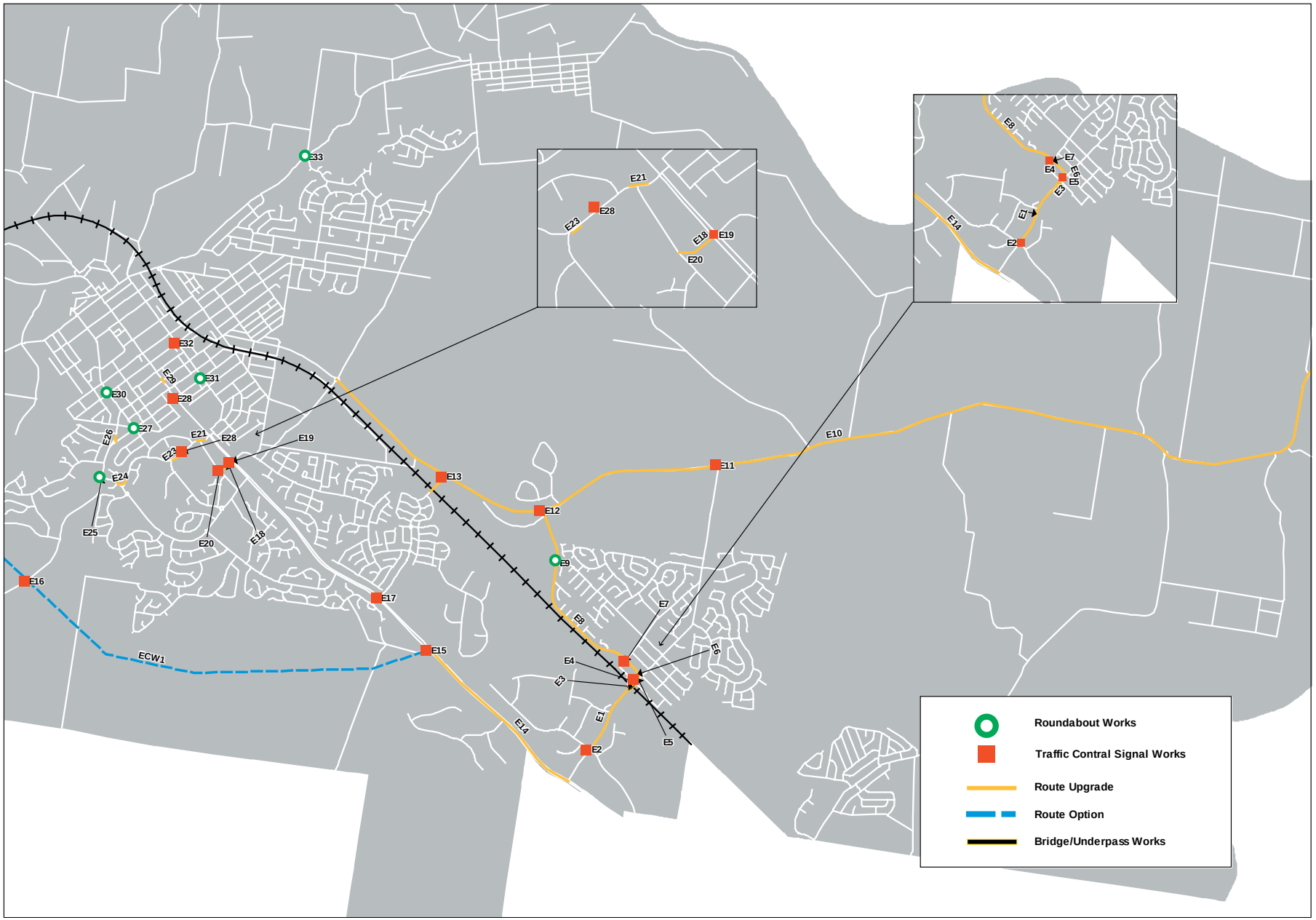


FIGURE 6.3 - CITY EAST

URaP
Urban Research & Planning

ADDITIONAL INFORMATION

1. Carbon Trading Scheme

Carbon Sequestration & Trading Potentials in Maitland

Plantations of trees for the purposes of carbon sequestering and carbon offset trading may be permanent, or they may be harvested on a regular basis, with the cropping cycle for these being approximately 20 years.

The latter appear to be the most efficient in terms of mass of carbon sequestered, and overall cost benefit; *carbon sequestered in harvested plantations, after 100 years is approximately three times that which would occur in an unharvested plantation over the same period**. Unharvested plantations have a greater potential for biodiversity maintenance, sequestering carbon to a useful level though not as much as in the cropping type. The cyclic, harvested plantations will have some value for biodiversity conservation if native species, particularly locally native tree species, are grown.

A possible hybrid system wherein trees are selectively harvested from a mixed native species plantation or native vegetation regeneration, could potentially serve all purposes at once, though not to the maximum effectiveness for any of these purposes.

* Submission by TreeSmart Australia to the National Emissions Trading Taskforce, 22 December 2006.

Commercial crops

Harvested Wood Products (HWP)

Hardwoods: Almost all of the eucalypts native to the Maitland LGA produce excellent hardwood timber valuable for a wide range of construction purposes, framing, tool handles etc. They thus have potential as plantation timbers for both carbon sequestration and HWPs.

These species are: *Corymbia maculata* (spotted gum), ***Eucalyptus crebra***, (narrow-leaf ironbark), *E. fibrosa*, (broad-leaf ironbark), *E. moluccana* (grey box), *E. pilularis* (blackbutt), *E. punctata* (grey gum), *E. resinifera*, (red mahogany), *E. saligna*, (Sydney bluegum), *E. siderophloia* (grey ironbark), *E. tereticornis* (forest redgum), and *E. umbra*, (white mahogany).

Being locally native, they would be the dominants of many of the natural plant communities of the LGA and would be appropriate for planting as the dominants of native vegetation areas being regenerated and at the same time be of value in biodiversity conservation.

They would also be appropriate for the possible 'hybrid' system mentioned above.

Cabinet timbers: A number of softwood tree species which produce high quality cabinet timbers could be investigated for their potential in plantations for carbon sequestering and harvest value. These include red cedar (*Toona ciliata*), Queensland walnut (*Endiandra palmerstonii*), northern silky oak (*Cardwellia sublimis*), Queensland maple (*Flindersia brayleyana*), coachwood (*Ceratopetalum apetalum*), rose mahogany (*Dysoxylum fraseri*), yellow carabeen (*Sloanea woollsii*), and black bean (*Castanospermum australe*). They are mostly Australian rainforest trees, only one, red cedar, being locally native.

These would require careful research and assessment in regard to ecological requirements, as well as to the market potential.

Plantations of these species particularly would be best mixed, because of the potential for pest build up. They may also take longer than twenty years to reach a size suitable for milling.

Low lying lands of the Maitland LGA

There are large areas of open, flat, sometimes poorly drained alluvial areas, currently floodlands, in the LGA. Some, perhaps much of these lands appear to be affected by exclusions or embargos on use, imposed by the NSW Dept of Water and Energy, because of their floodway designation. This should be investigated and discussed with those authorities with a view to enabling appropriate uses, especially related to carbon sequestering and carbon offset trading, biofuels, and the regeneration of extinct or near extinct native vegetation types.

Biofuel

The growing of crops such as maize for production of alcohol to be used in fuel for motor vehicles is one purpose to which some of the better drained low lying flood lands could be put. Such an application, even if not useful in carbon offset trading (though this should be investigated), may be both commercially viable, and a source of renewable energy which counteracts the dependence on fossil fuels and would mitigate buildup of atmospheric carbon dioxide.

Use of low lying floodlands for vegetation regeneration and biodiversity maintenance

- see below in next section.

Biodiversity maintenance & regeneration of extinct and remnant native vegetation

Permanent tree plantations for carbon sequestering, if managed appropriately, could to some extent be useful in biodiversity maintenance & conservation. However, this arrangement would fulfil neither of those needs to the most efficient or effective level.

Regeneration of depleted vegetation types, or reconstruction of extinct types of native vegetation communities, as such, rather than as plantations of one or a few species, would serve the dual purposes of biodiversity conservation, and provision of tradable carbon assets.

Two of the three vegetation types now extinct in the Maitland LGA, and several others almost extinct, are denizens of the low lying floodlands. These are, extinct: Swamp Mahogany – Paperbark Forest, and Mangrove Estuarine Complex; almost extinct (98% or 99% reduced from original): Freshwater Wetland Complex, Swamp Oak – Rushland Forest, and Alluvial Tall Moist Forest. Such communities have many dependent life forms and regeneration of these vegetation types would do much for biodiversity maintenance. At the same time, being dominated by trees, they must be valuable in carbon sequestering and hence have a potential for carbon offset trading.

Hunter Valley Dry Rainforest, and Central Hunter Riparian Forest (95% and 75% reduced from original) are vegetation types once found along the Hunter River banks and nearby. If re-established in such places, they would have a bank stabilising effect as well as serving both biodiversity conservation, and carbon trading purposes.

Biobanking is a system of replacing/restoring native vegetation or boosting remnants, as an offset for the removal of native vegetation for the purposes of development. It is being investigated currently by the NSW Government with a view to implementing regulating legislation soon.

It is fraught with risks relating to the complexity and component species integration and interdependence, and time and resources necessary to regenerate mature systems; compliance monitoring; etc.

SUMMARY

Actionable initiatives with carbon sequestration and trading potential, and biodiversity benefit offsets, worth consideration by Maitland City Council include the following:

Hardwood plantations. The most feasible and cost effective carbon sequestration and trading initiatives for the Maitland LGA are hardwood plantations using locally native eucalypts. Such species are adapted to the various local environments and should thus grow well and produce a merchantable product within a twenty year plantation cycle.

Growth rates achievable should translate to maximum carbon sequestration rate. End use of the timber produced, in building construction and the like, would give rise to best on-going carbon retention. Combination of these two factors should give rise to high carbon trading value.

Different species would be better adapted to the different environments found in the LGA; this aspect would require some ecological and silvicultural research.

There is potential for establishment of tree plantations in flood prone lowlands to achieve soil stabilisation and slowing of flood waters, both of which would have the potential to reduce soil erosion from floods.

Plantations of cabinet timber softwoods have potential for both carbon sequestration and trading, and timber end product, and would in general, be similar to the above, with the following qualifications:

- ecological needs (soil fertility and drainage; shelter from dry winds, etc) of the tree species involved would be more stringent, and would require careful investigation
- potential merchantability of the product would need to be assessed
- plantation cycle would likely be 30-50 years to produce suitable timber
- potential for add-on biodiversity benefit would be qualitatively different as the cabinet timbers from are rainforest trees

Regeneration of locally extinct and endangered plant communities would have carbon sequestering and trading potential approximately equivalent to 100 year plantation cycling. At the same time considerable biodiversity maintenance benefit would be achieved. Research would be required to ascertain the most appropriate of these communities to target; endangered species clusters, and land available, would be important considerations. Mixtures of species in plantations, rather than monoculture, should produce benefits in both silviculture and biodiversity maintenance.

Local Government
Climate Change
MITIGATION AND ADAPTATION PROGRAM

NSW Mayors' Agreement on Climate Change

We acknowledge that

- Evidence shows that climate change is occurring.
- Climate change will continue to have far reaching effects on Australia's people, economy, society and environment.

We welcome the

- Social, economic and environmental benefits which come from mitigating and adapting to climate change.
- Opportunity for local government in NSW to lead the response at a local level, encouraging and helping local residents, local businesses and other organisations to reduce their energy usage and costs, to adapt to the impacts of climate change and to improve the local environment.

We commit our Council from this date, October 3, 2007 to

- Establish a baseline of Council's greenhouse gas emissions, based on advice in the LGSA Climate Change Action Pack.
- Strive to meet or beat the Kyoto protocol targets in our own operations, activities and communities, through a range of activities that lead to a reduction in greenhouse gas emissions.
- Urge the State and Federal Government to enact policies and programs to meet or beat the greenhouse gas emissions reduction target, suggested for Australia in the Kyoto Protocol, of 108% of its 1990 baseline.
- Publicly declare to our Local Government Area, with appropriate plans, strategies and policies, Council's commitment to achieve a significant reduction in greenhouse gas emissions from our operations and to commit to set reduction targets for the next 5, 10, 20 years and beyond.
- Encourage all sectors in our local community to adapt to the impacts of climate change, to reduce their greenhouse gas emissions and to make public their commitment to action.
- Monitor the progress of our plans.
- Resource climate change initiatives.
- Adopt relevant actions from the LGSA's Climate Change Action Pack which will provide Council with guidance material to assist in developing climate change policies which are informed, relevant and achievable.

Our target is a 30% reduction based on 2007 by 2020

Maitland City Council acknowledges the increasing impact climate change will have on our community in the mid to long term future and commits to tackling the causes and effects of changing climate in our Local Government Area.

Signed – Peter Blackmore
Mayor

Signed - Cr Genia McCaffery
President LGA

Signed - Cr Bruce Miller
President Shires

2. Accident Data

SUMMARY OF ACCIDENT FACTORS - All Crashes - Fatality, Injury and Towaway, Maitland LGA 2004-2006

# Type of Accident		
Car Accident	800	90%
Light Truck Accident	175	20%
Rigid Truck Accident	19	2%
Articulated Truck Acc	24	3%
Heavy Truck Accident (1)	43	5%
Bus Accident	17	2%
Heavy Vehicle Accident (2)	60	7%
Emergency Vehicle Acc	1	0%
Motorcycle Accident	60	7%
Pedal Cycle Accident	20	2%
Pedestrian Accident	40	4%

(1) Rigid or Artic. Truck, (2) Heavy Truck or Bus
 # These categories are not mutually exclusive

Location Type		
* Intersection Crash	439	49%
Non-intersection Crash	452	51%

** Up to 10m from an intersection*

Collision Type		
Single Vehicle Accident	236	26%
Multi-Vehicle Accident	655	74%

Contributing Factors		
Speed Involved	138	15%
Fatigue Involved	71	8%

Weather		
Fine	728	82%
Raining	86	10%
Overcast	65	7%
Fog or Mist	9	1%
Other	3	0%

Road Surface Condition		
Wet	121	14%
Dry	768	86%
Snow/Ice	0	0%

Natural Lighting		
Dawn	26	3%
Daylight	630	71%
Dusk	33	4%
Darkness	202	23%

Accident Group		
Intersection,adjacent approaches	142	16%
Head-on (Not Overtaking)	28	3%
Opposing vehicles; turning	65	7%
U-turn	16	2%
Rear-End	250	28%
Lane Change	23	3%
Parallel lanes; turning	9	1%
Vehicle leaving driveway	12	1%
Overtaking; same direction	5	1%
Hit parked vehicle	2	0%
Hit railway train	0	0%
Hit pedestrian	28	3%
Permanent obstruction on road	0	0%
Hit animal	11	1%
Off road, on straight	11	1%
Off road on straight, hit object	124	14%
Out of control on straight	19	2%
Off road, on curve	21	2%
Off road on curve, hit object	57	6%
Out of control on curve	11	1%
Other crash type	57	6%

Month of the Year											
January	February	March	April	May	June	July	August	September	October	November	December
62	50	88	72	79	84	84	80	69	80	67	76
7%	6%	10%	8%	9%	9%	9%	9%	8%	9%	8%	9%

Degree of Accident		
Fatal	17	2%
Injury	423	47%
Non-Casualty	451	51%

Casualties		
Killed	20	3%
Injured	567	97%
Total Casualties	587	

Casualties	Year	Crashes
0	2001	0
0	2002	0
0	2003	0
197	2004	296
216	2005	297
174	2006	298
0	2007*	0

Day of the Week		
Monday	90	10%
Tuesday	121	14%
Wednesday	149	17%
Thursday	158	18%
Friday	138	15%
Saturday	136	15%
Sunday	99	11%

Time of Day		
0:01 - 2:59am	37	4%
3:00 - 4:59am	19	2%
5:00 - 5:59am	15	2%
6:00 - 6:59am	24	3%
7:00 - 7:59am	45	5%
8:00 - 8:59am	44	5%
9:00 - 9:59am	39	4%
10:00 - 10:59am	54	6%
11:00 - 11:59am	48	5%
12:00 - 12:59pm	51	6%
1:00 - 1:59pm	49	5%
2:00 - 2:59pm	56	6%
3:00 - 3:59pm	103	12%
4:00 - 4:59pm	82	9%
5:00 - 5:59pm	64	7%
6:00 - 6:59pm	41	5%
7:00 - 7:59pm	37	4%
8:00 - 9:59pm	54	6%
10:00 - 0:00am	29	3%

Season of the Year		
Summer	188	21%
Autumn	239	27%
Winter	248	28%
Spring	216	24%

SUMMARY OF ACCIDENT FACTORS - Pedestrian crashes in Maitland LGA, Maitland LGA Maitland LGA

# Type of Accident		
Car Accident	47	70%
Light Truck Accident	11	16%
Rigid Truck Accident	0	0%
Articulated Truck Acc	0	0%
Heavy Truck Accident (1)	0	0%
Bus Accident	2	3%
Heavy Vehicle Accident (2)	2	3%
Emergency Vehicle Acc	0	0%
Motorcycle Accident	2	3%
Pedal Cycle Accident	0	0%
Pedestrian Accident	67	100%

(1) Rigid or Artic. Truck, (2) Heavy Truck or Bus

 # These categories are not mutually exclusive

Location Type		
* Intersection Crash	34	51%
Non-intersection Crash	33	49%

** Up to 10m from an intersection*

Collision Type		
Single Vehicle Accident	0	0%
Multi-Vehicle Accident	67	100%

Contributing Factors		
Speed Involved	0	0%
Fatigue Involved	0	0%

Weather		
Fine	55	82%
Raining	6	9%
Overcast	6	9%
Fog or Mist	0	0%
Other	0	0%

Road Surface Condition		
Wet	8	12%
Dry	59	88%
Snow/Ice	0	0%

Natural Lighting		
Dawn	2	3%
Daylight	45	67%
Dusk	3	4%
Darkness	17	25%

Accident Group		
Intersection,adjacent approaches	0	0%
Head-on (Not Overtaking)	0	0%
Opposing vehicles; turning	0	0%
U-turn	0	0%
Rear-End	0	0%
Lane Change	0	0%
Parallel lanes; turning	0	0%
Vehicle leaving driveway	0	0%
Overtaking; same direction	0	0%
Hit parked vehicle	0	0%
Hit railway train	0	0%
Hit pedestrian	50	75%
Permanent obstruction on road	0	0%
Hit animal	0	0%
Off road, on straight	0	0%
Off road on straight, hit object	0	0%
Out of control on straight	0	0%
Off road, on curve	0	0%
Off road on curve, hit object	0	0%
Out of control on curve	0	0%
Other crash type	17	25%

Month of the Year											
January	February	March	April	May	June	July	August	September	October	November	December
4	14	8	4	2	9	8	3	8	5	2	0
6%	21%	12%	6%	3%	13%	12%	4%	12%	7%	3%	0%

Degree of Accident		
Fatal	5	7%
Injury	62	93%
Non-Casualty	0	0%

Casualties		
Killed	5	7%
Injured	64	93%
Total Casualties	69	

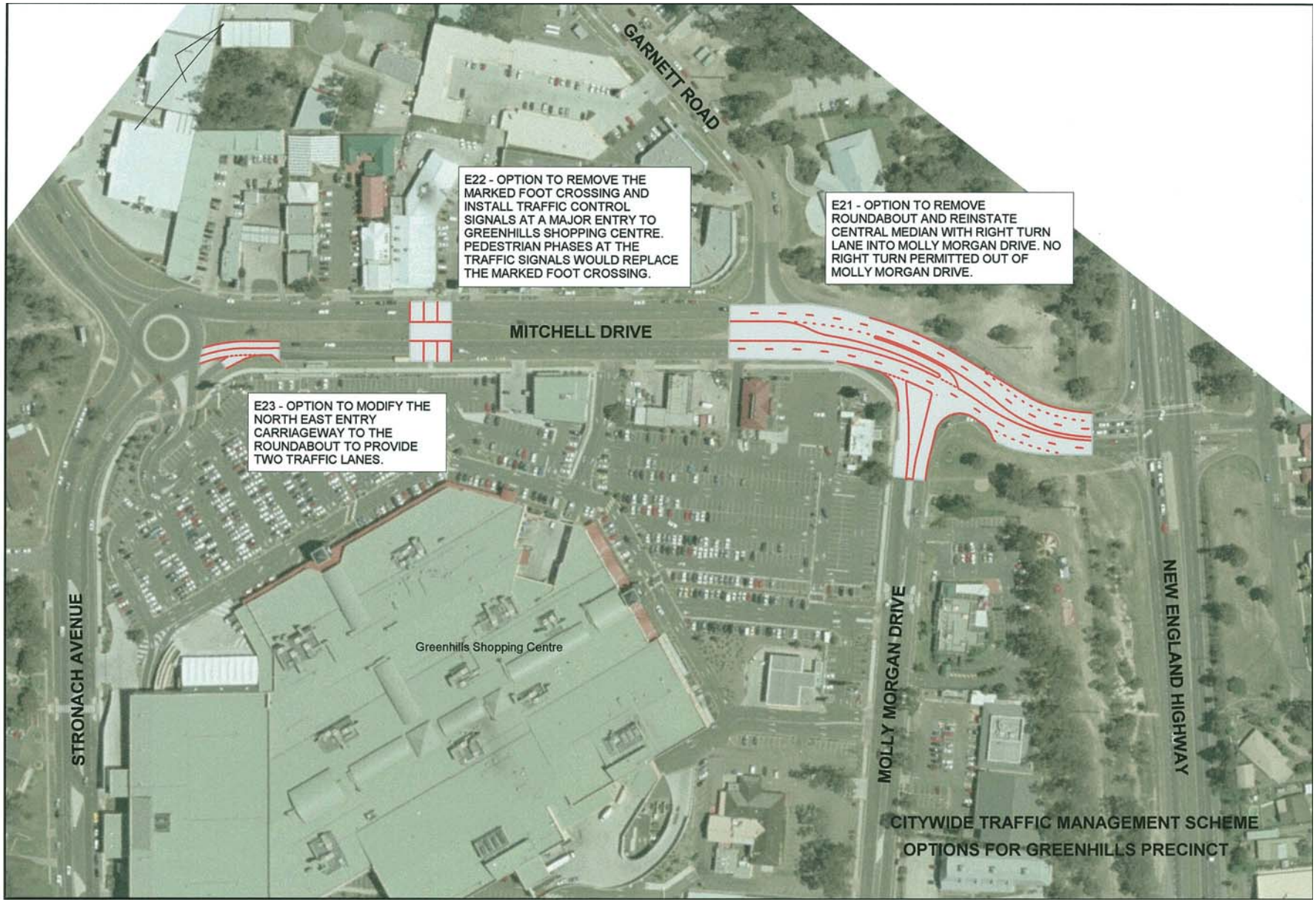
Casualties	Year	Crashes
0	2001	0
8	2002	8
17	2003	16
13	2004	13
15	2005	14
11	2006	11
5	2007*	5

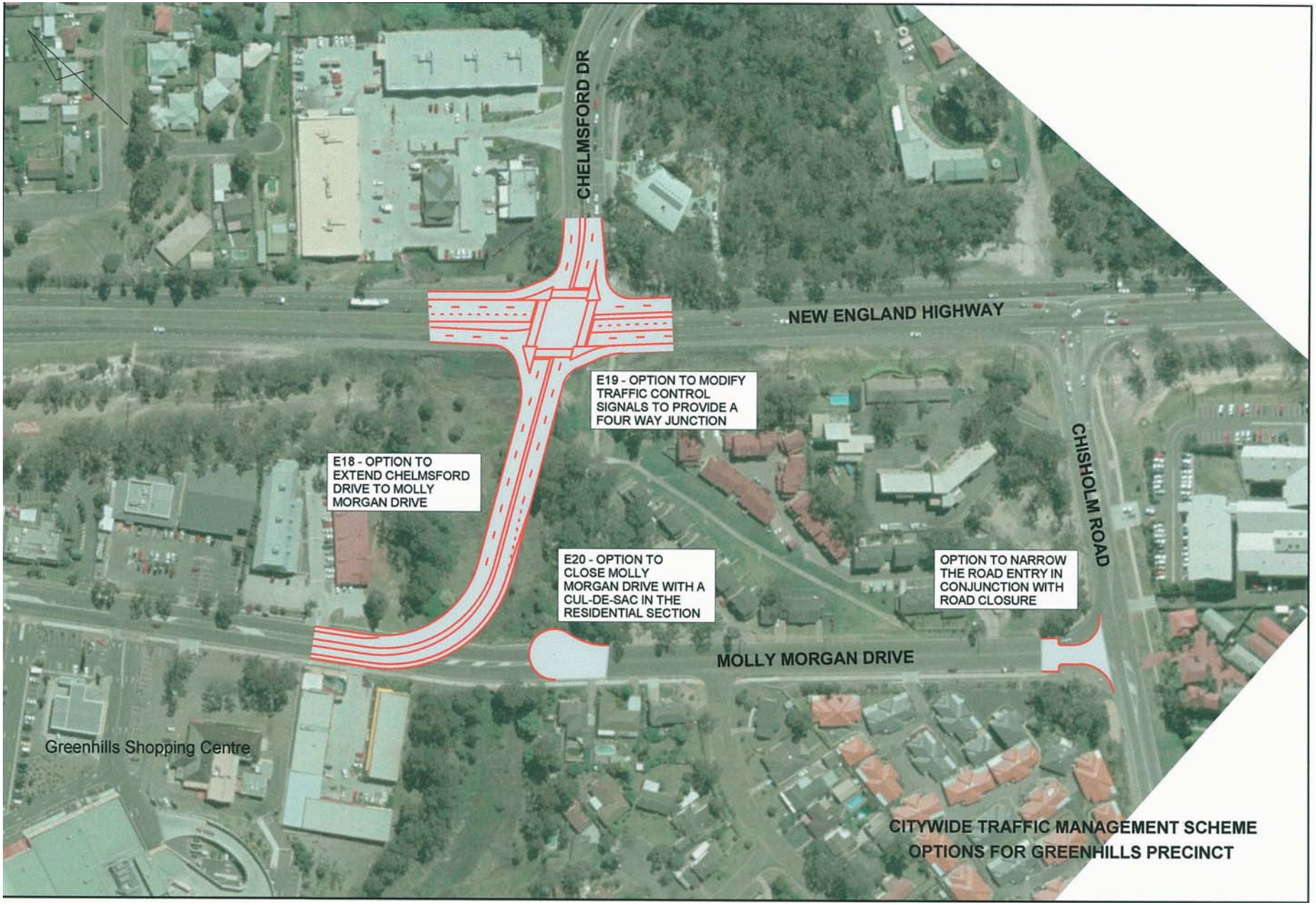
Day of the Week		
Monday	9	13%
Tuesday	10	15%
Wednesday	8	12%
Thursday	10	15%
Friday	17	25%
Saturday	10	15%
Sunday	3	4%

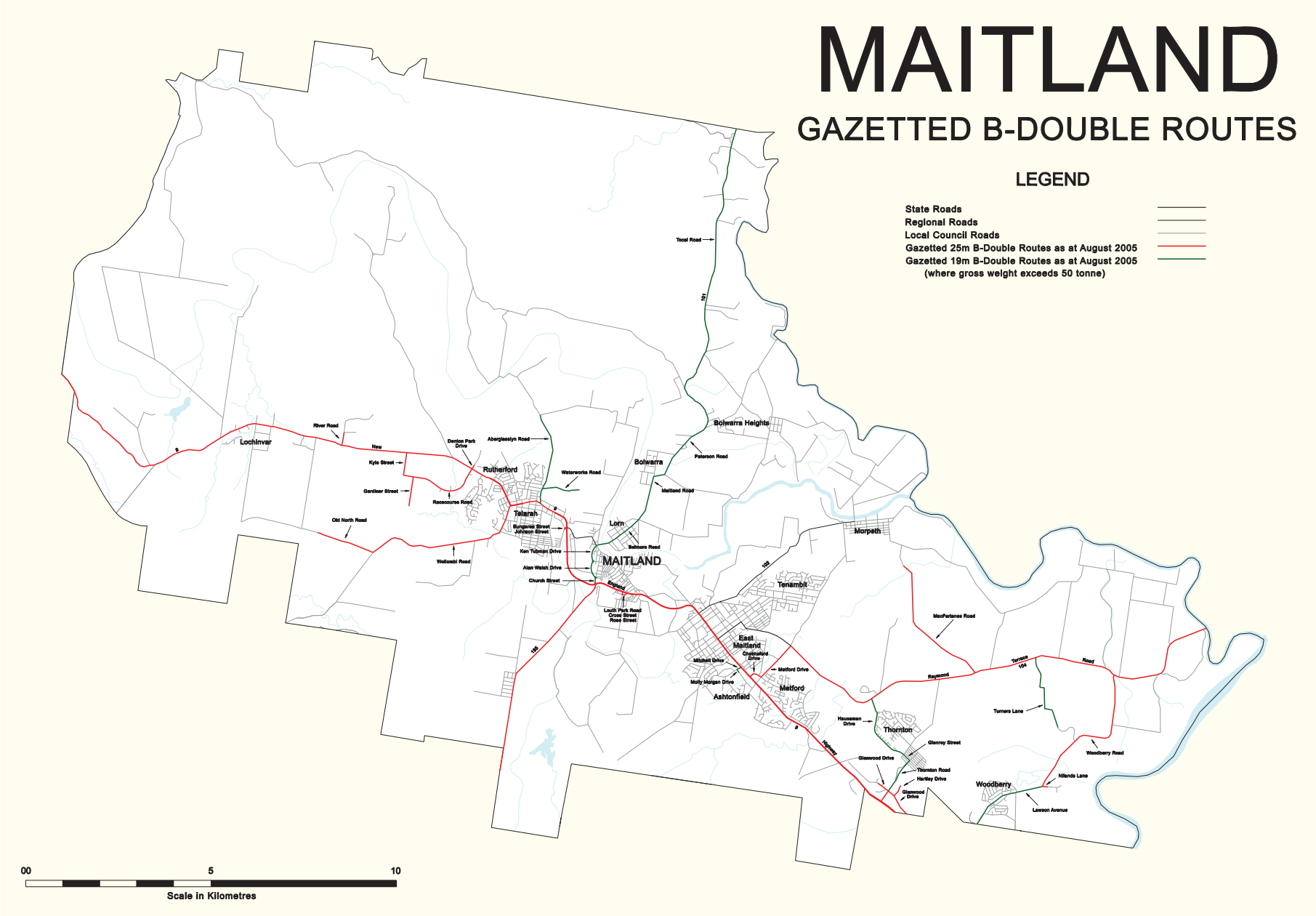
Time of Day		
0:01 - 2:59am	3	4%
3:00 - 4:59am	1	1%
5:00 - 5:59am	0	0%
6:00 - 6:59am	2	3%
7:00 - 7:59am	3	4%
8:00 - 8:59am	4	6%
9:00 - 9:59am	5	7%
10:00 - 10:59am	7	10%
11:00 - 11:59am	3	4%
12:00 - 12:59pm	1	1%
1:00 - 1:59pm	2	3%
2:00 - 2:59pm	7	10%
3:00 - 3:59pm	7	10%
4:00 - 4:59pm	4	6%
5:00 - 5:59pm	3	4%
6:00 - 6:59pm	4	6%
7:00 - 7:59pm	4	6%
8:00 - 9:59pm	5	7%
10:00 - 0:00am	2	3%

Season of the Year		
Summer	18	27%
Autumn	14	21%
Winter	20	30%
Spring	15	22%

3. Greenhills Access Management Plan







Acknowledgements:

The study team wishes to thank Council's staff for their assistance and input throughout the study process. Special thanks to Chris James, Group Manager Assets and Infrastructure Planning and Monica Gibson, Manager City Strategy for their advice and time. The regular support and participation of Scott Henderson, Project Engineer, is greatly appreciated and has made the completion of this study much easier.

Core Study Team

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Paul van den Bos	Transport Modelling
Craig Garner	Traffic Management and Road Design
Geoffrey Britton	Urban Design
Robyn Hawes	Urban Planning
Michelle Hessing	Graphic Design/Report Presentation
Dr Ben Wallace	Botanical Expert

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APPENDIX A

TRANSPORT MODELLING RESULTS

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FIGURE A4.2A - EXISTING NETWORK TRAFFIC VOLUMES 2006

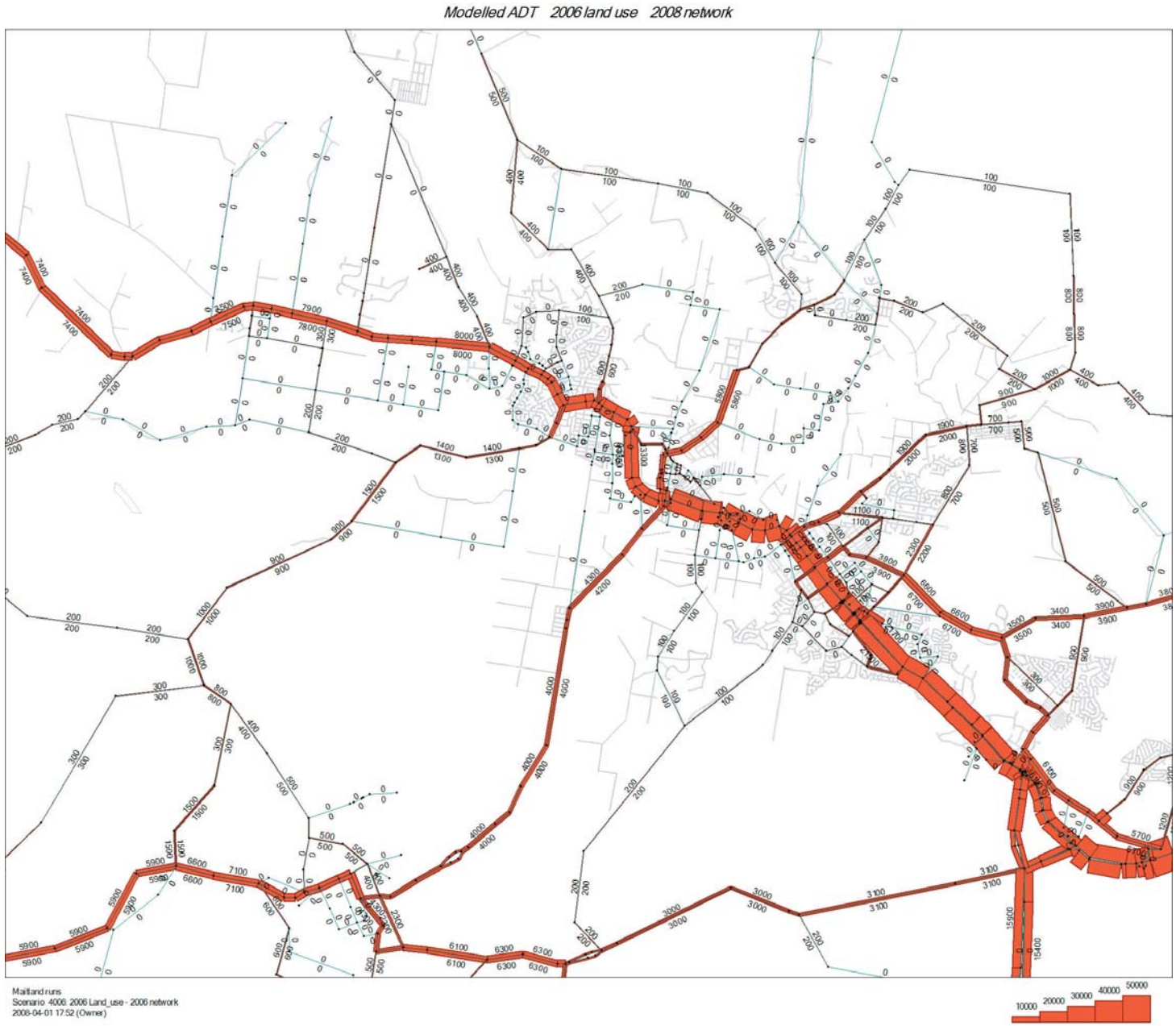


FIGURE A4.2B - EXISTING NETWORK TRAFFIC VOLUMES 2016

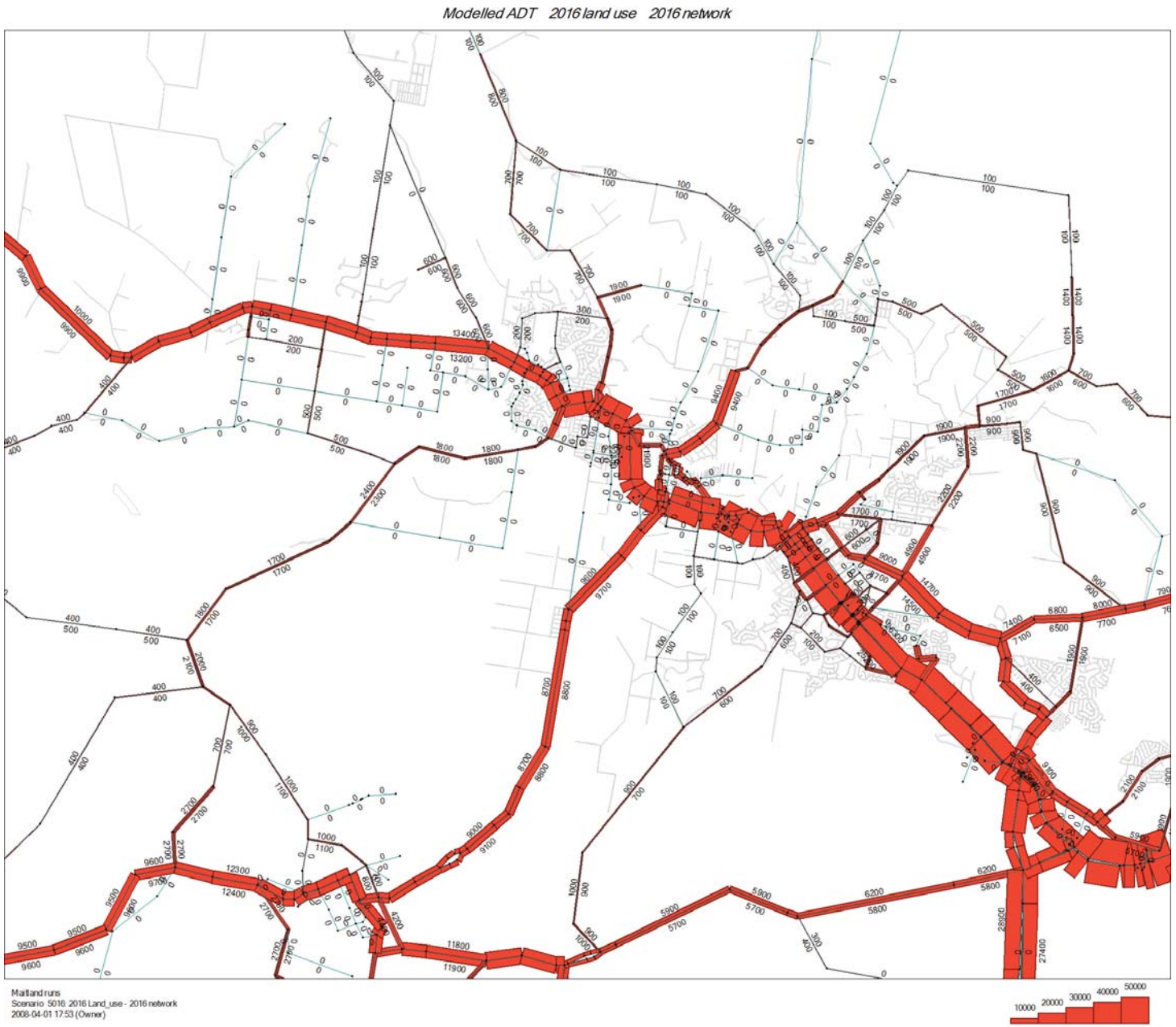


FIGURE A4.2C - PROPOSED NETWORK TRAFFIC VOLUMES 2016

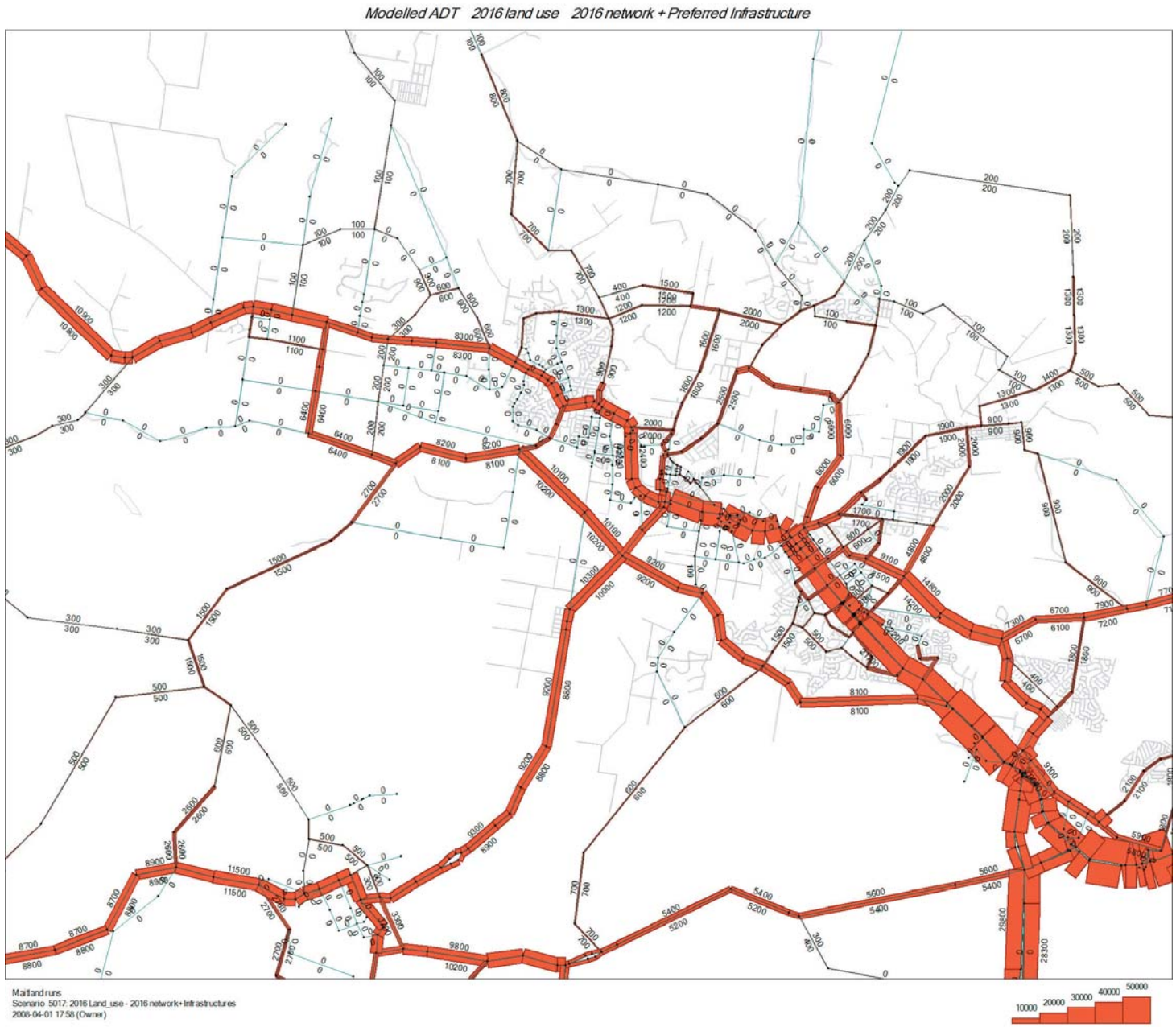
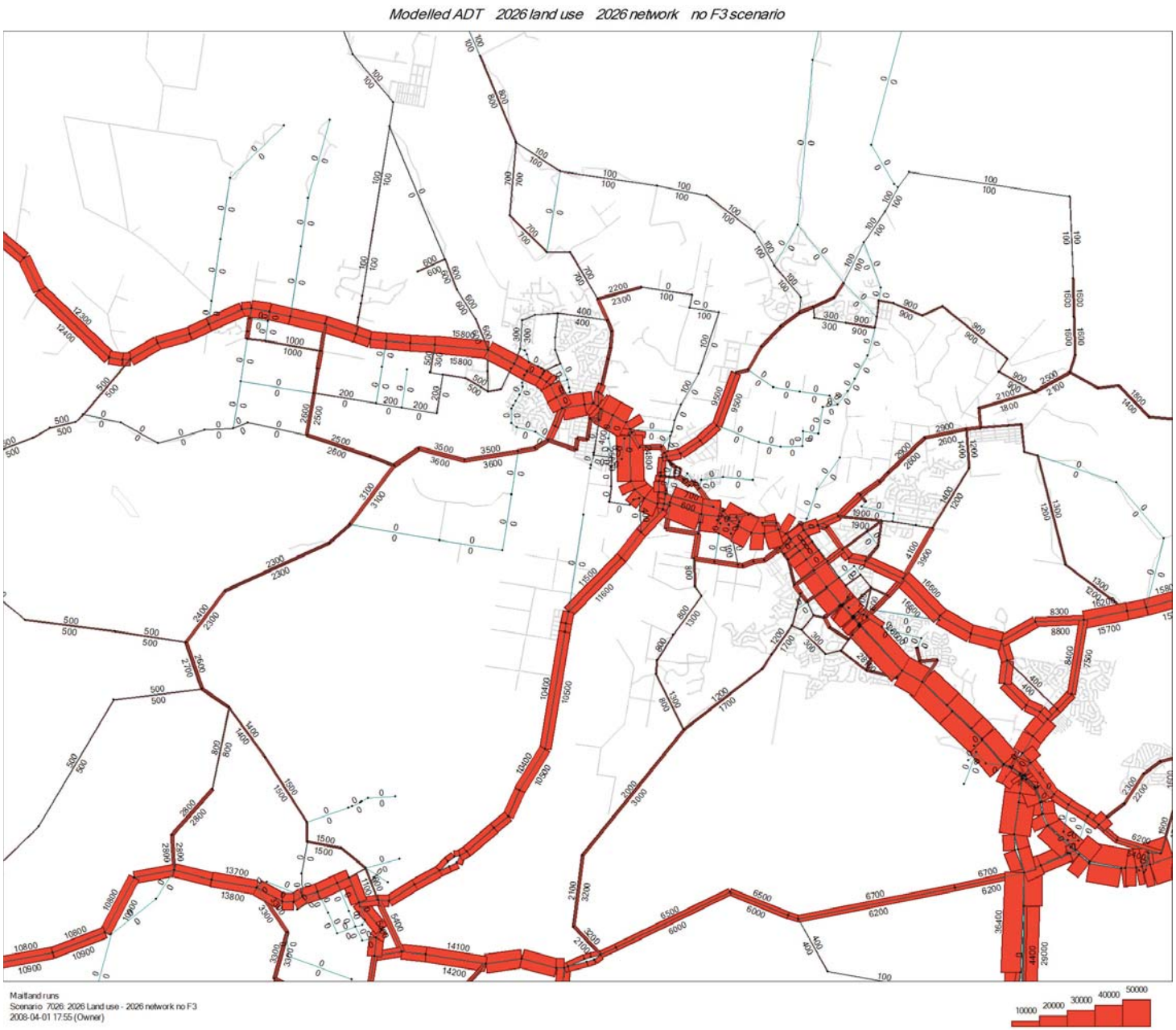


FIGURE A4.2D - EXISTING NETWORK TRAFFIC VOLUMES 2026



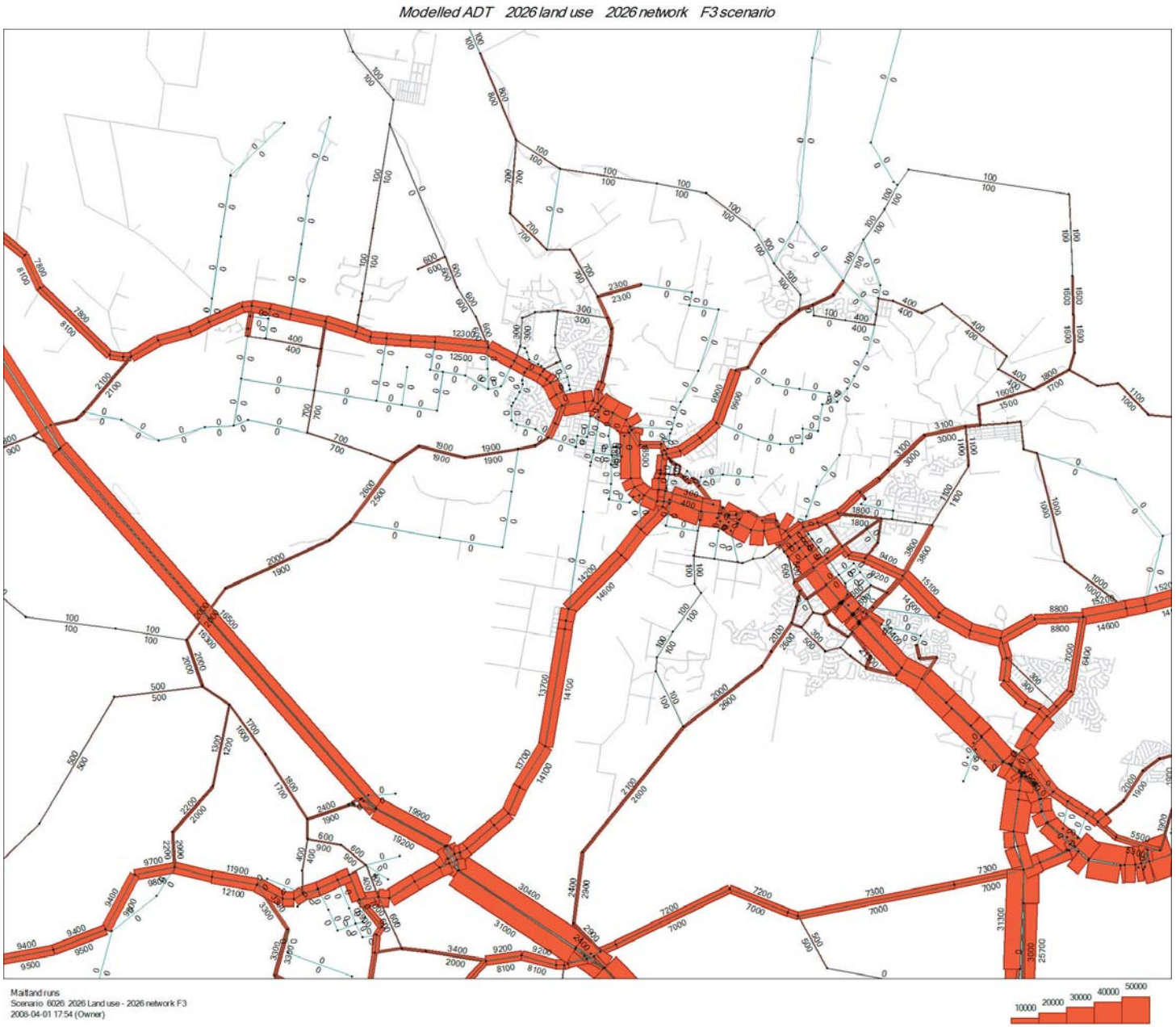


FIGURE A4.2E - EXISTING NETWORK + HUNTER EXPRESSWAY TRAFFIC VOLUMES 2026

FIGURE A4.2F - PROPOSED NETWORK + HUNTER EXPRESSWAY TRAFFIC VOLUMES 2026

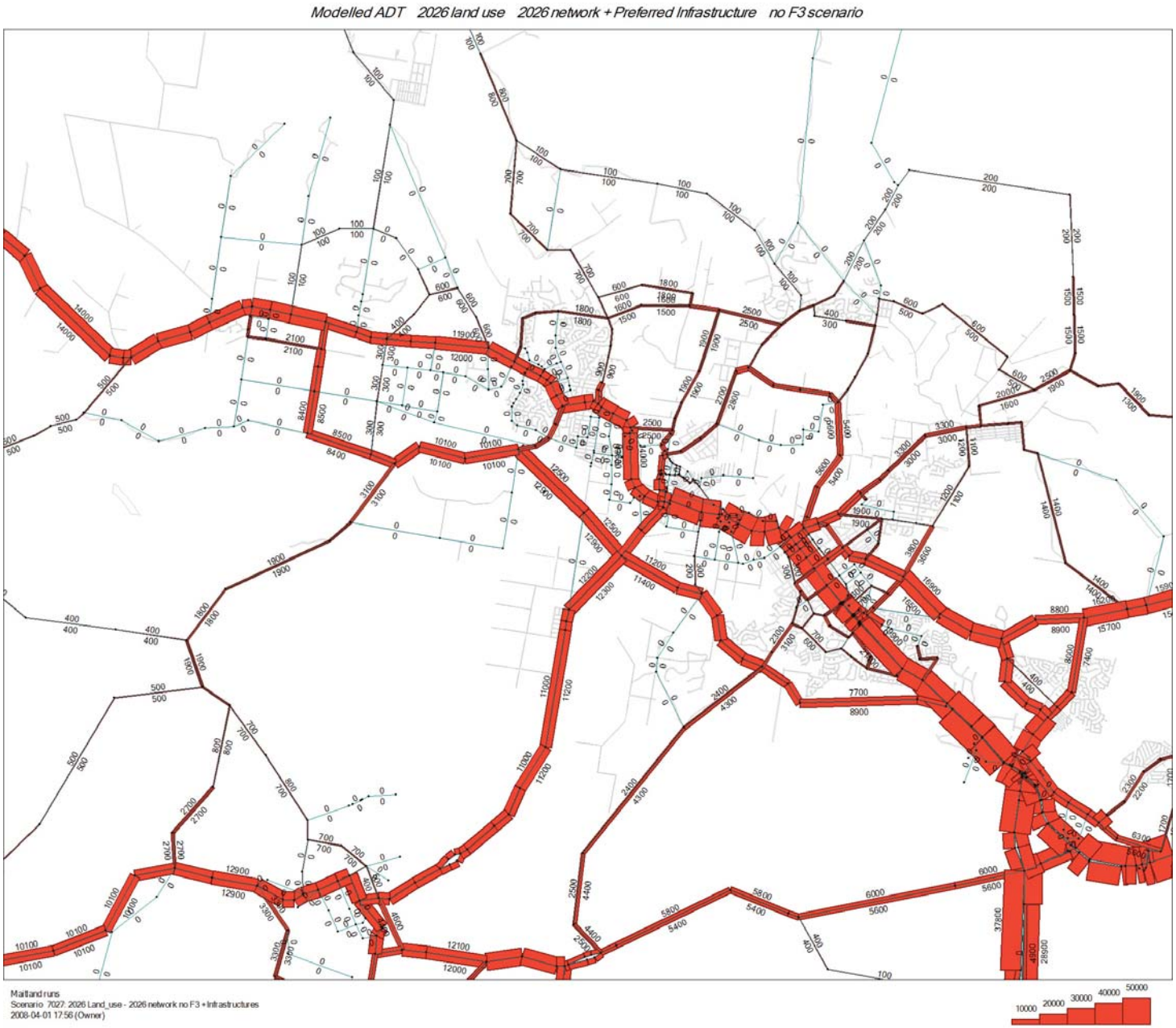
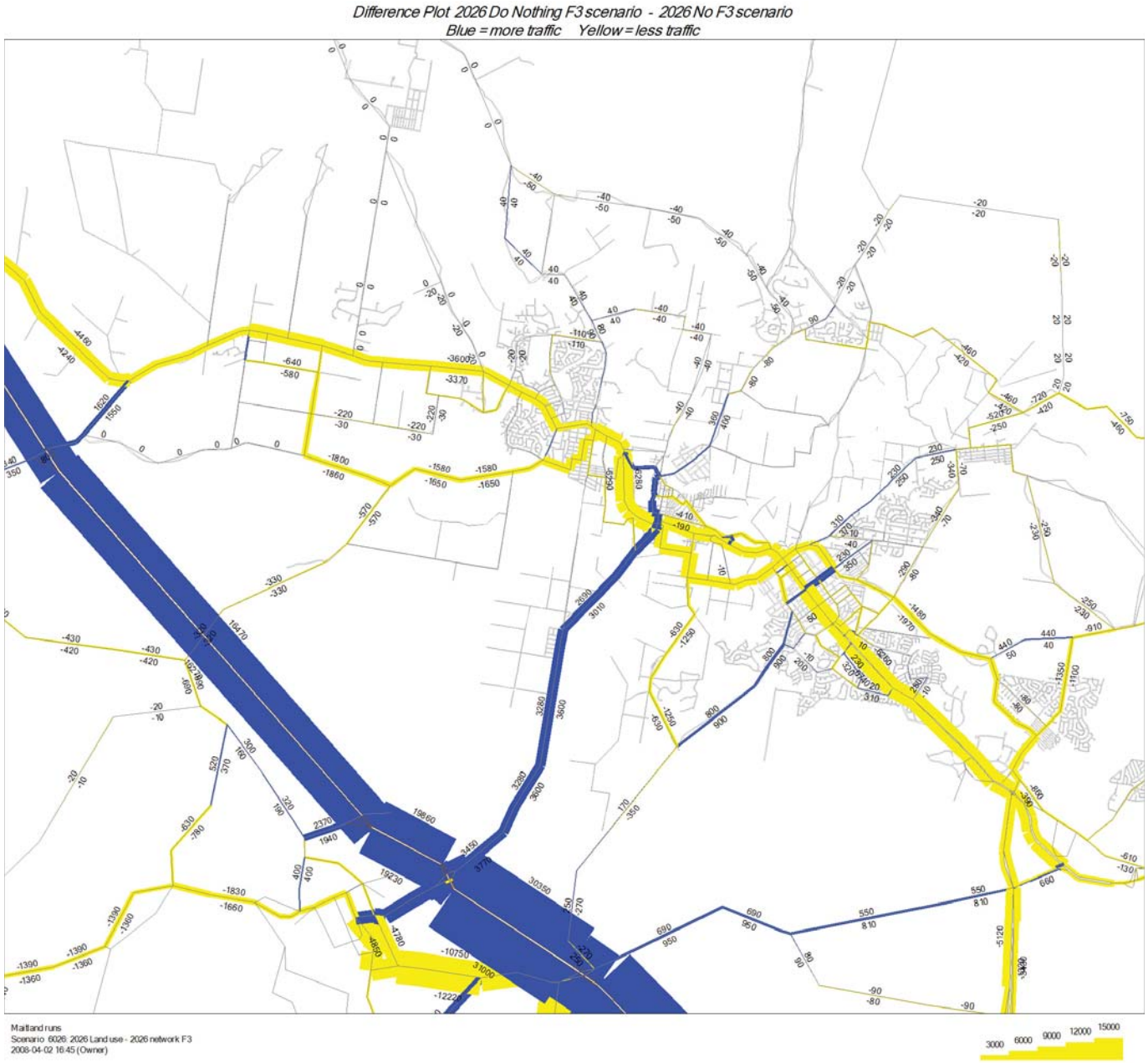


FIGURE A4.2G - PROPOSED NETWORK TRAFFIC VOLUMES 2026

Modelled ADT 2026 land use 2026 network + Preferred Infrastructure F3 scenario

FIGURE A4.3A - DIFFERENCE PLOTS: 2026 SCENARIOS: EXISTING NETWORK AND EXISTING NETWORK + HUNTER EXPRESSWAY



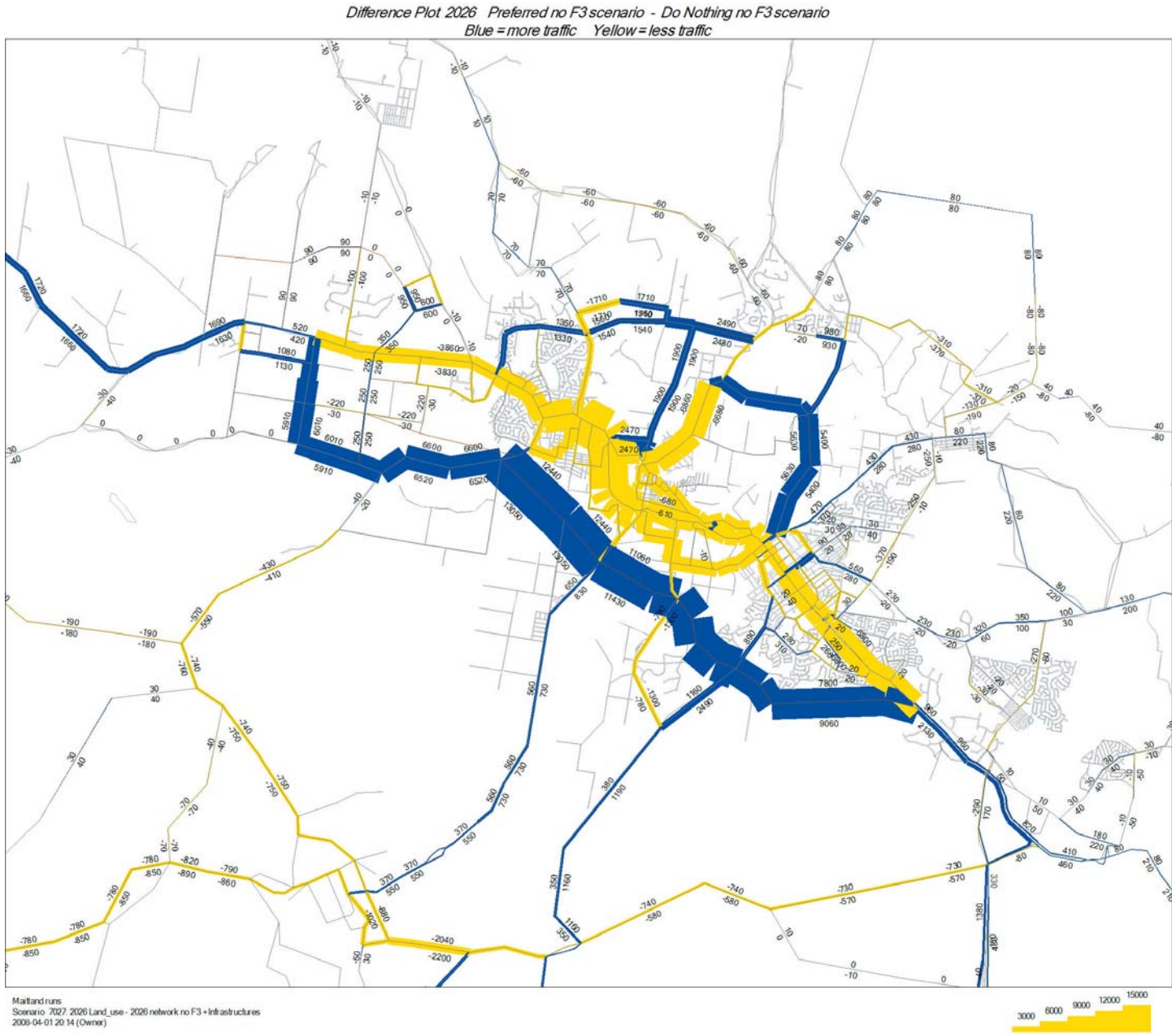
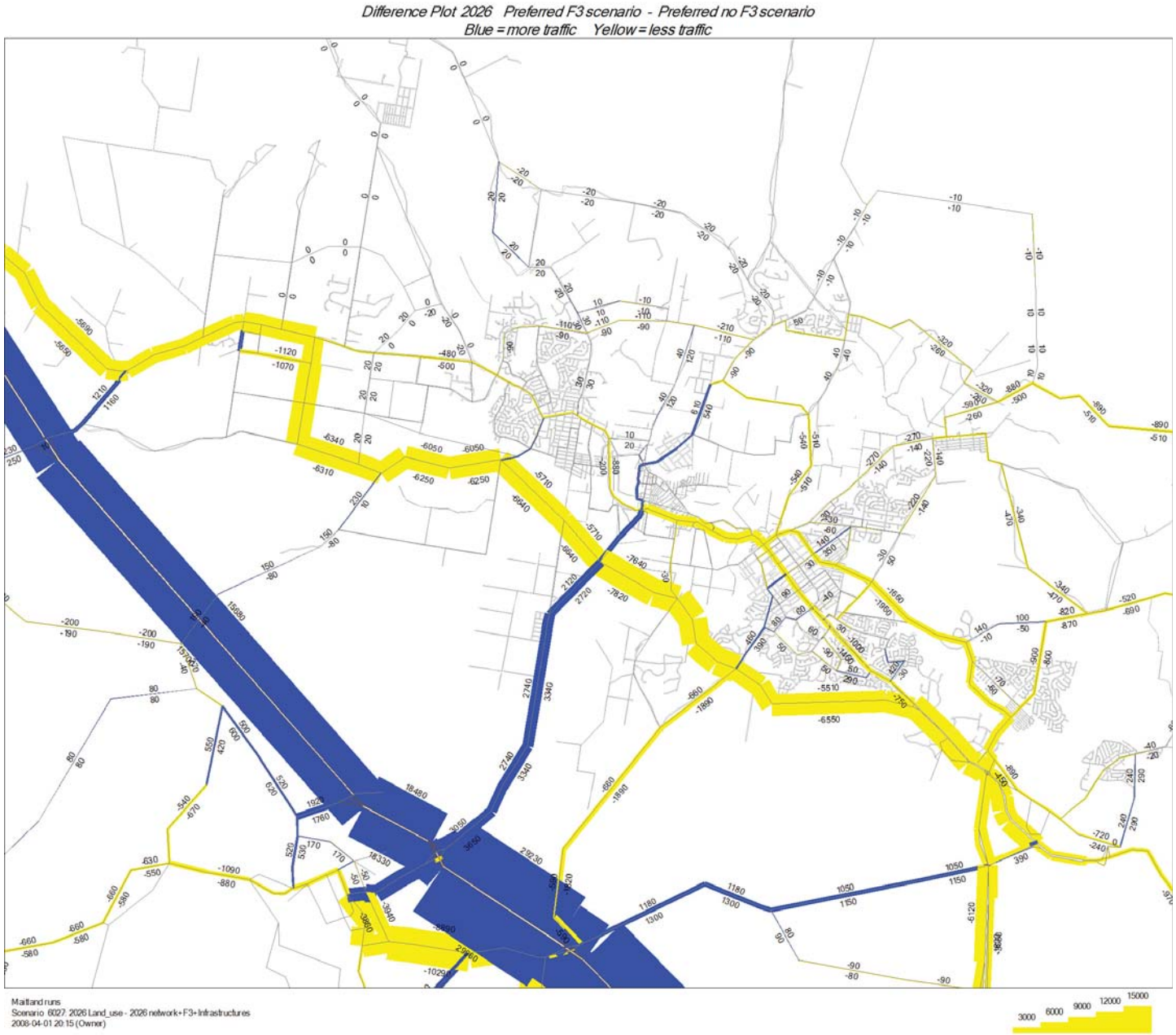


FIGURE A4.3B - DIFFERENCE PLOTS: 2026 SCENARIOS: EXISTING NETWORK AND PROPOSED NETWORK

FIGURE A4.3C - DIFFERENCE PLOTS: 2026 SCENARIOS: PROPOSED NETWORK AND PROPOSED NETWORK + HUNTER EXPRESSWAY



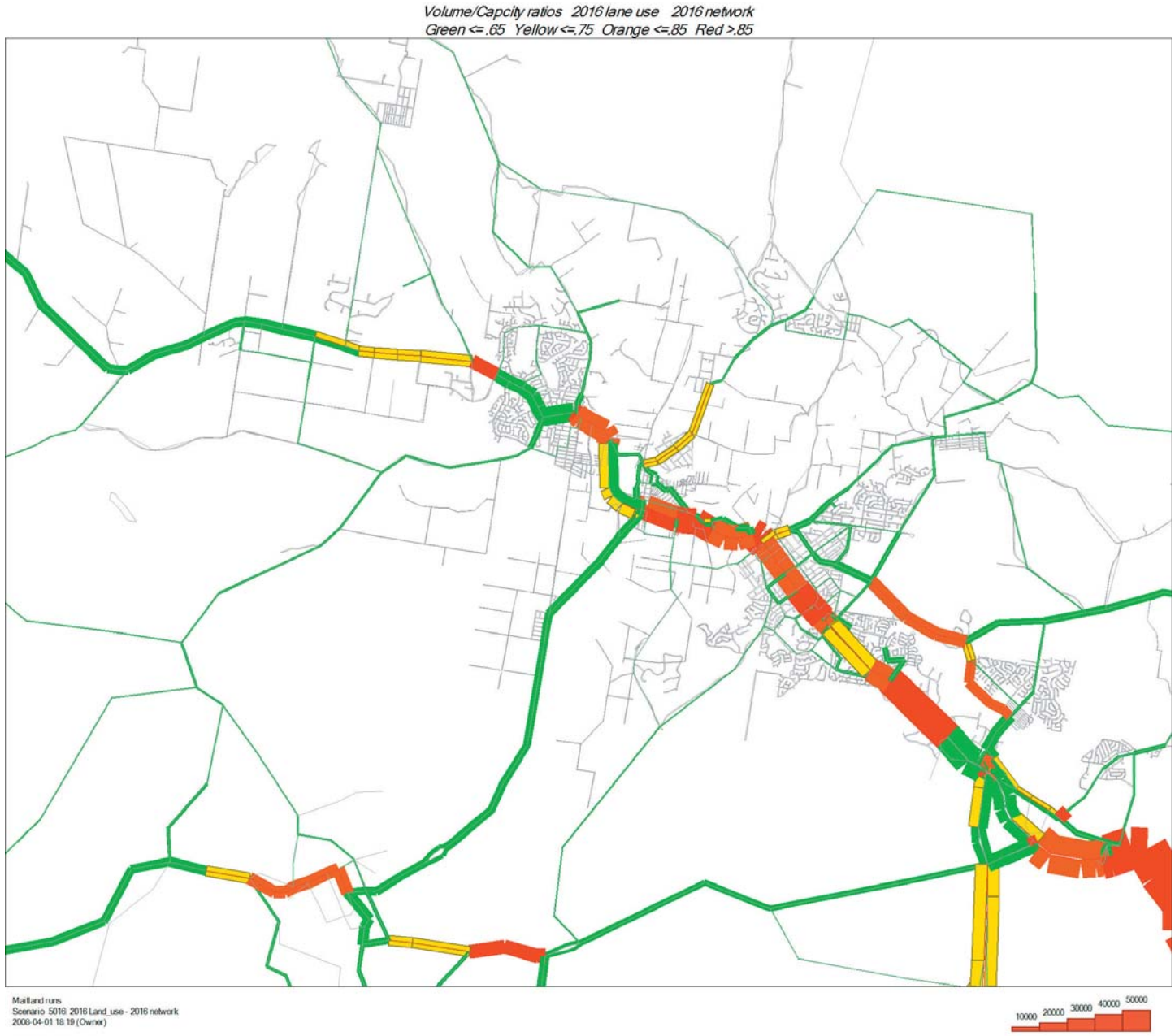
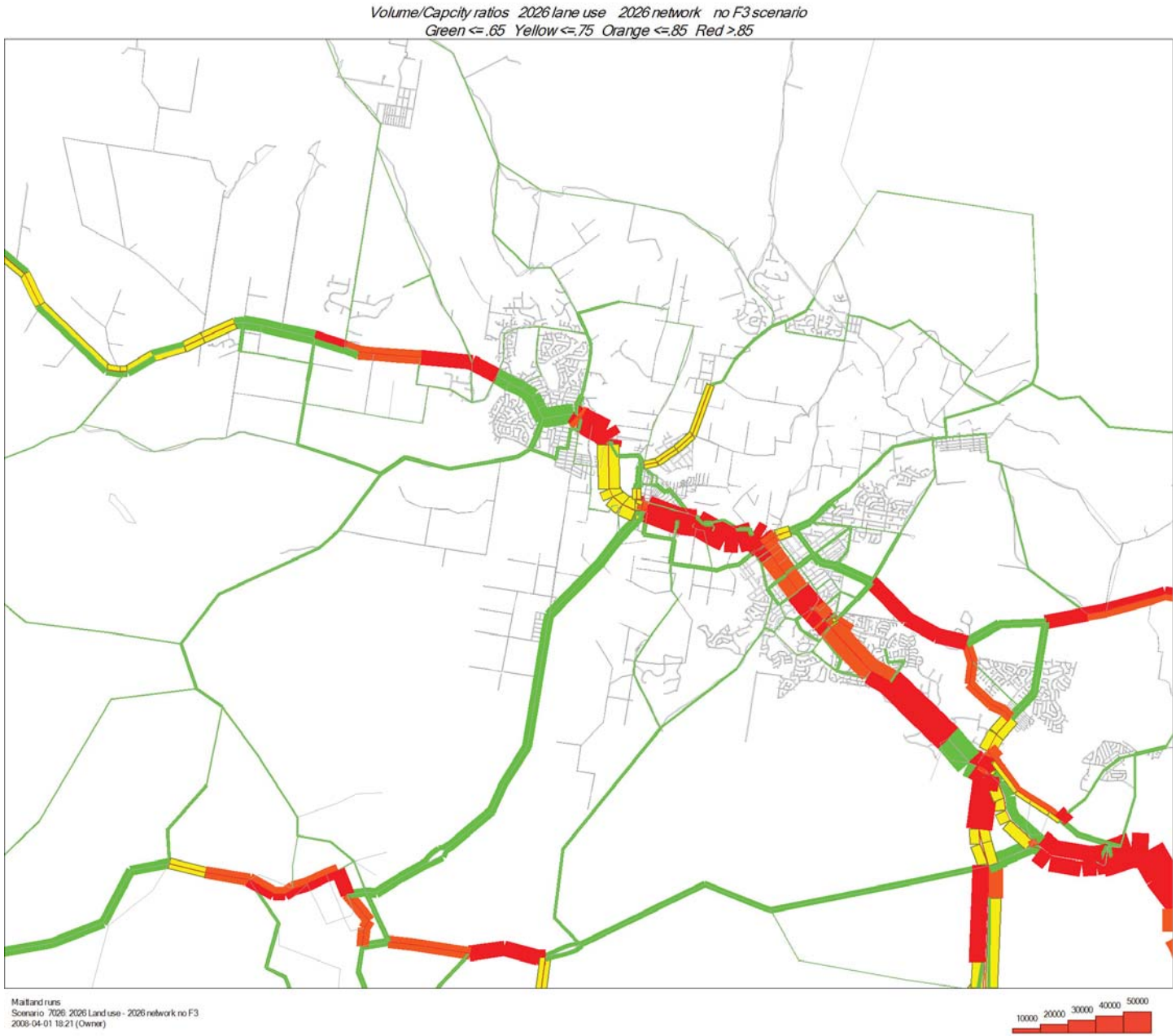


FIGURE A4.4A - LEVEL OF SERVICE (2016) – EXISTING NETWORK

FIGURE A4.4B - LEVEL OF SERVICE (2026) – EXISTING NETWORK



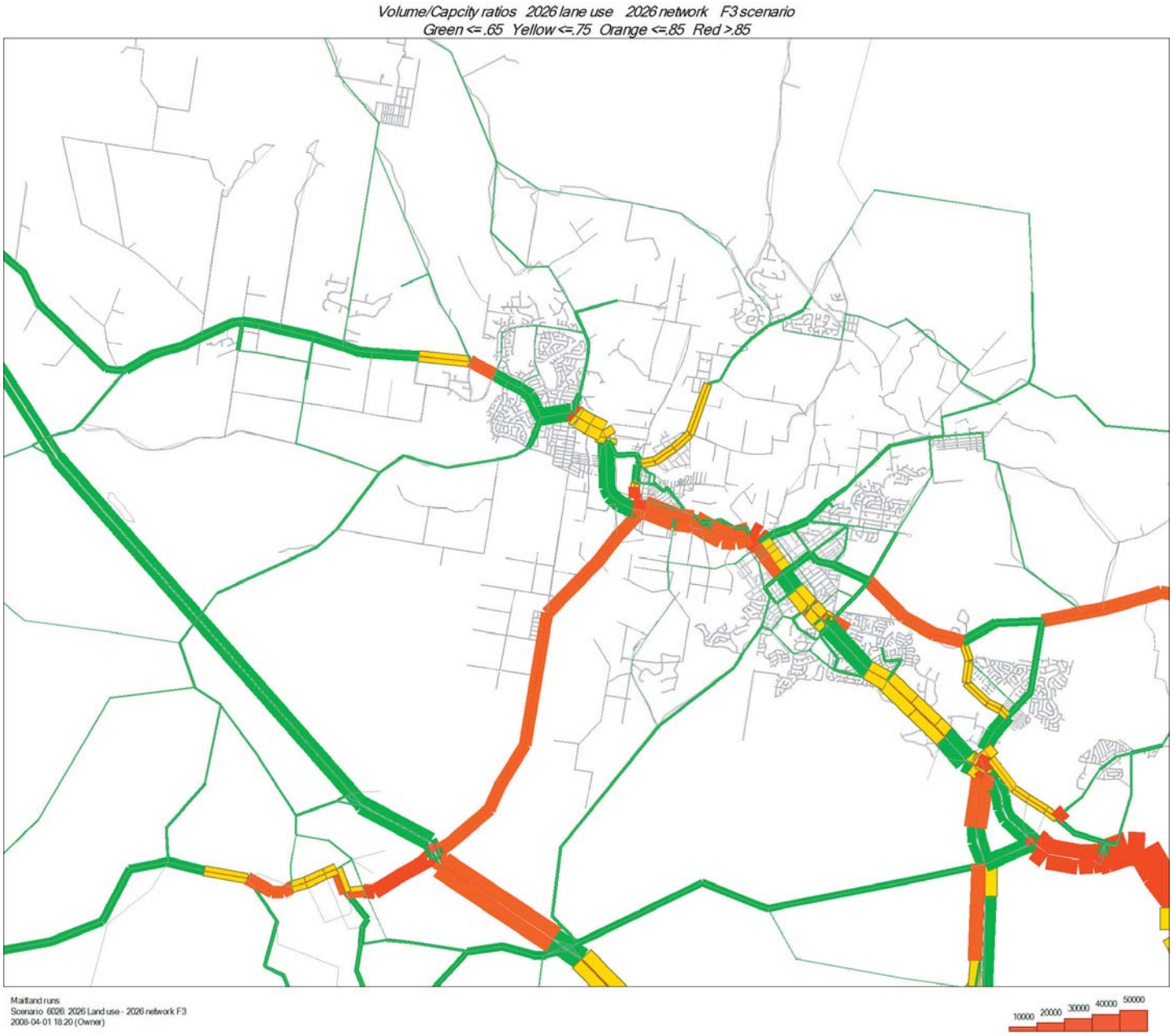
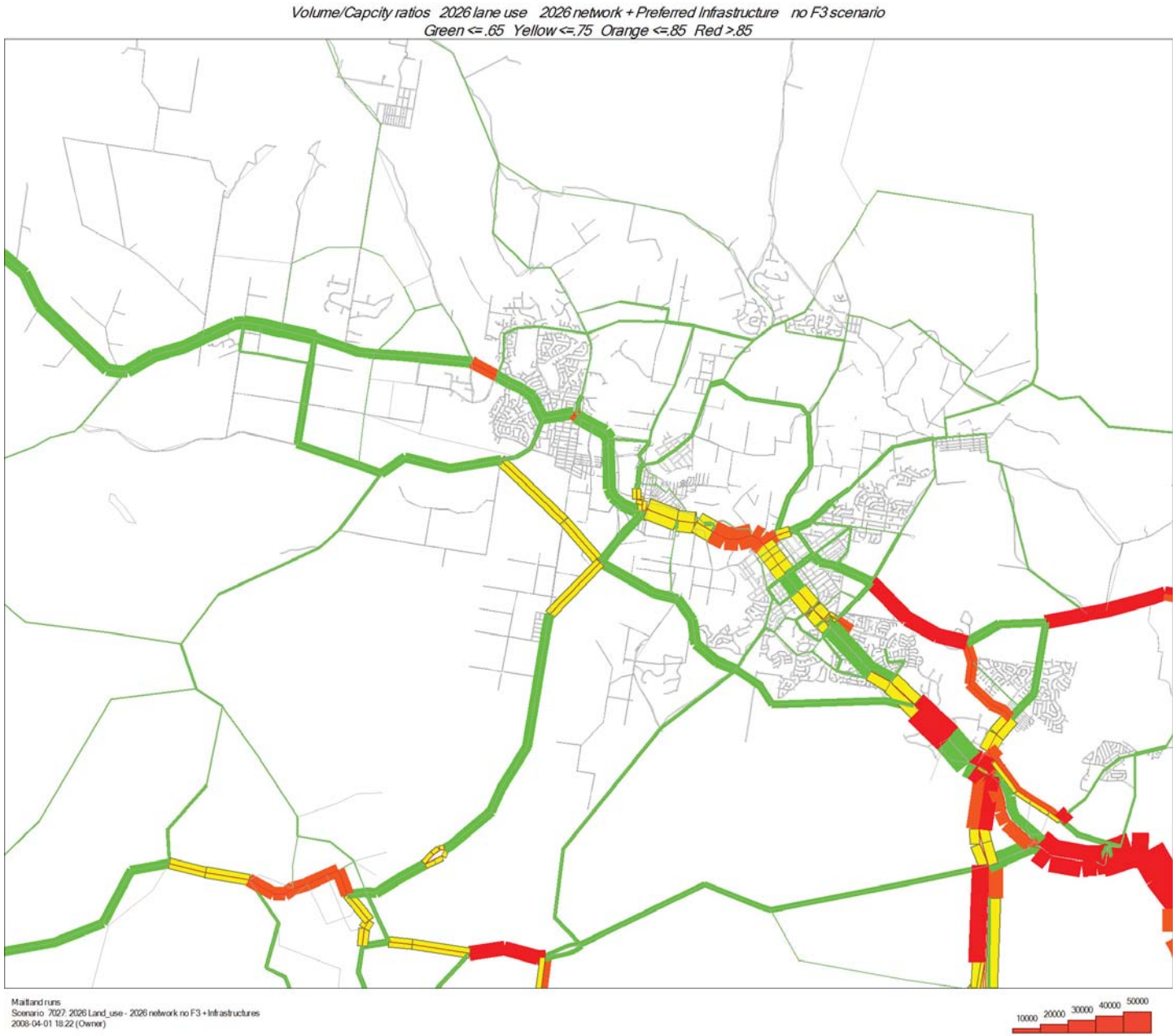


FIGURE A4.4C - LEVEL OF SERVICE (2026) – EXISTING NETWORK + HUNTER EXPRESSWAY

FIGURE A4.4D - LEVEL OF SERVICE (2026) – PROPOSED NETWORK



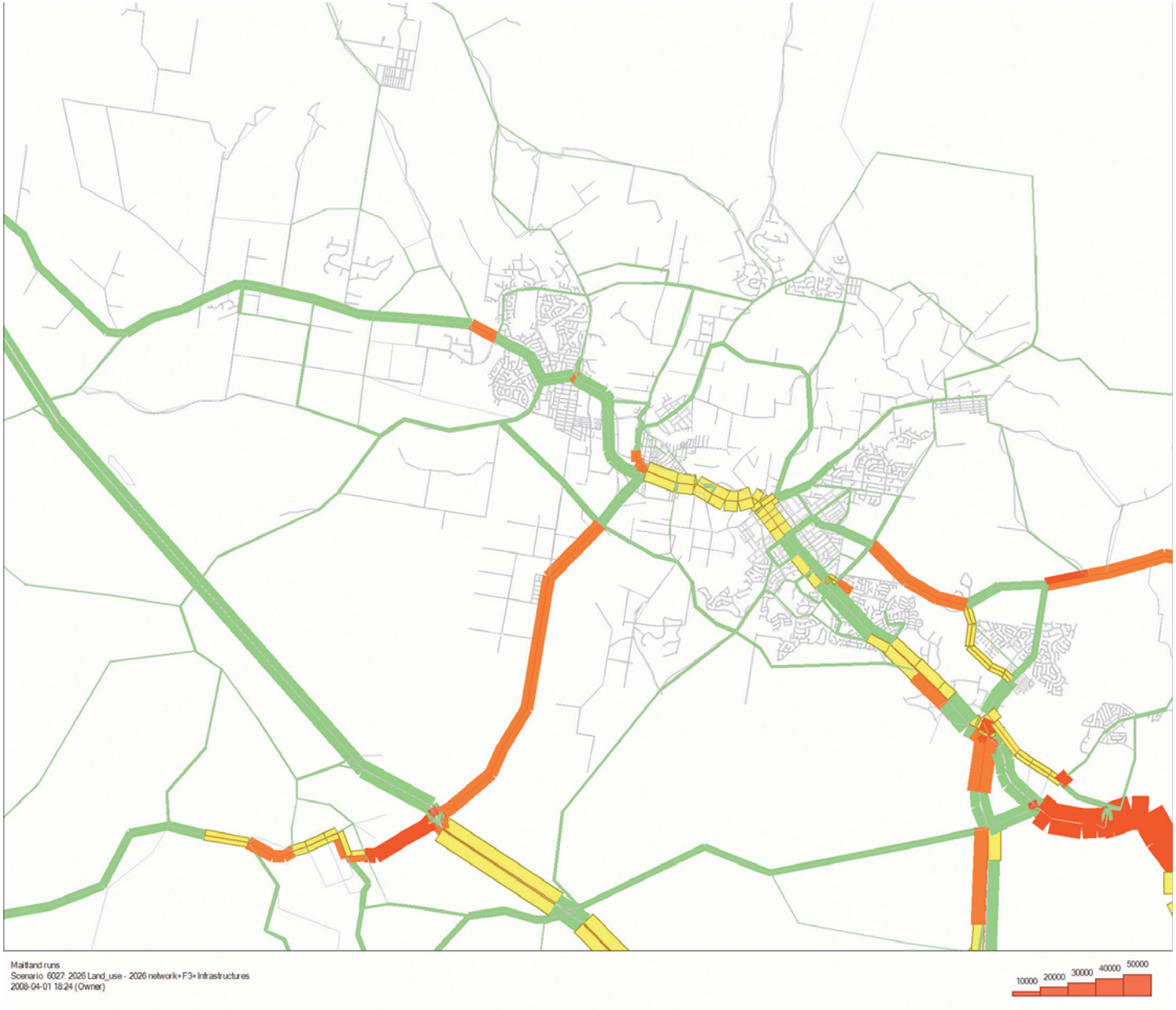
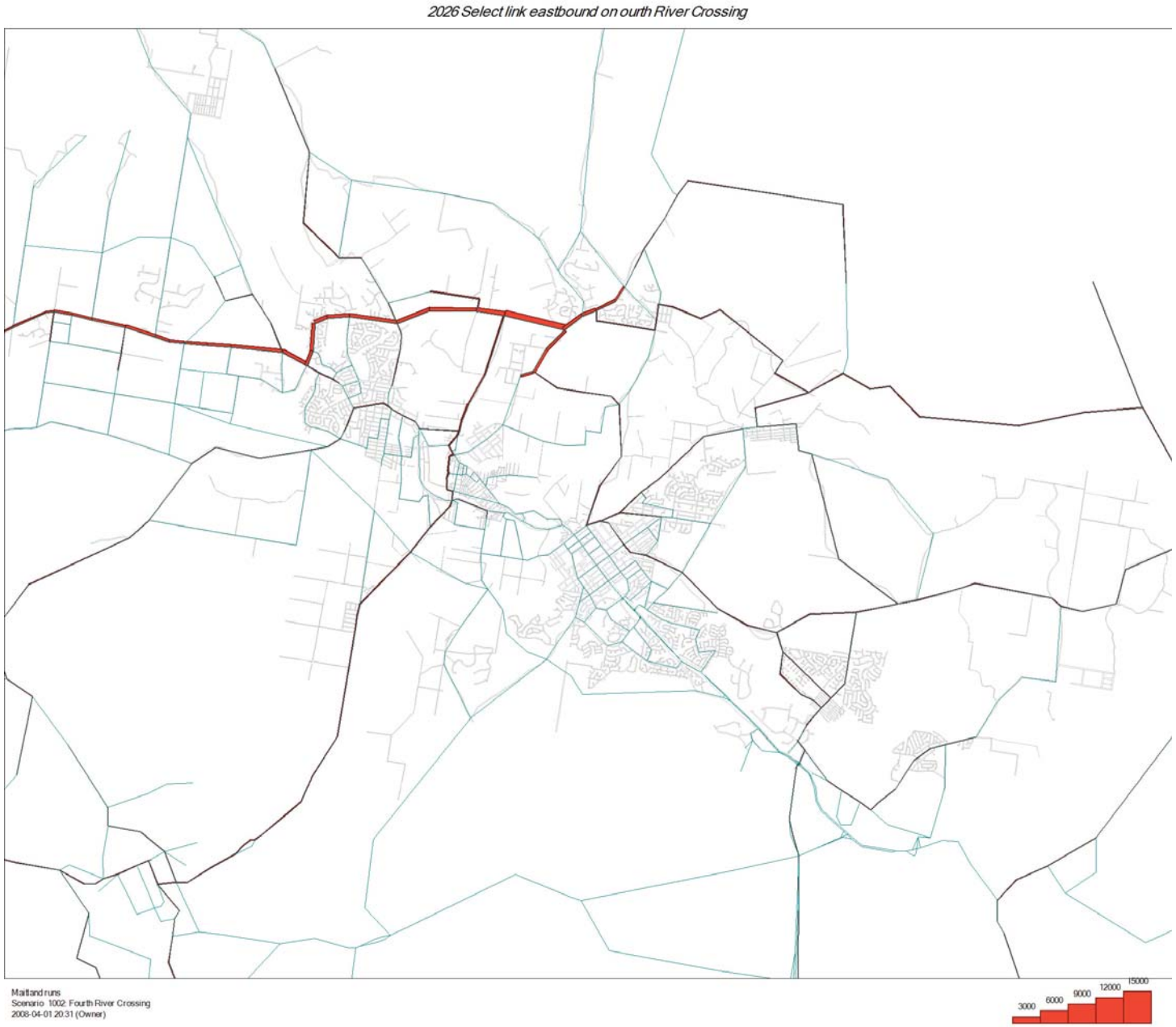


FIGURE A4.4E - LEVEL OF SERVICE (2026) – PROPOSED NETWORK+ HUNTER EXPRESSWAY

FIGURE A4.5A - SELECT LINK: PROPOSED FOURTH RIVER CROSSING



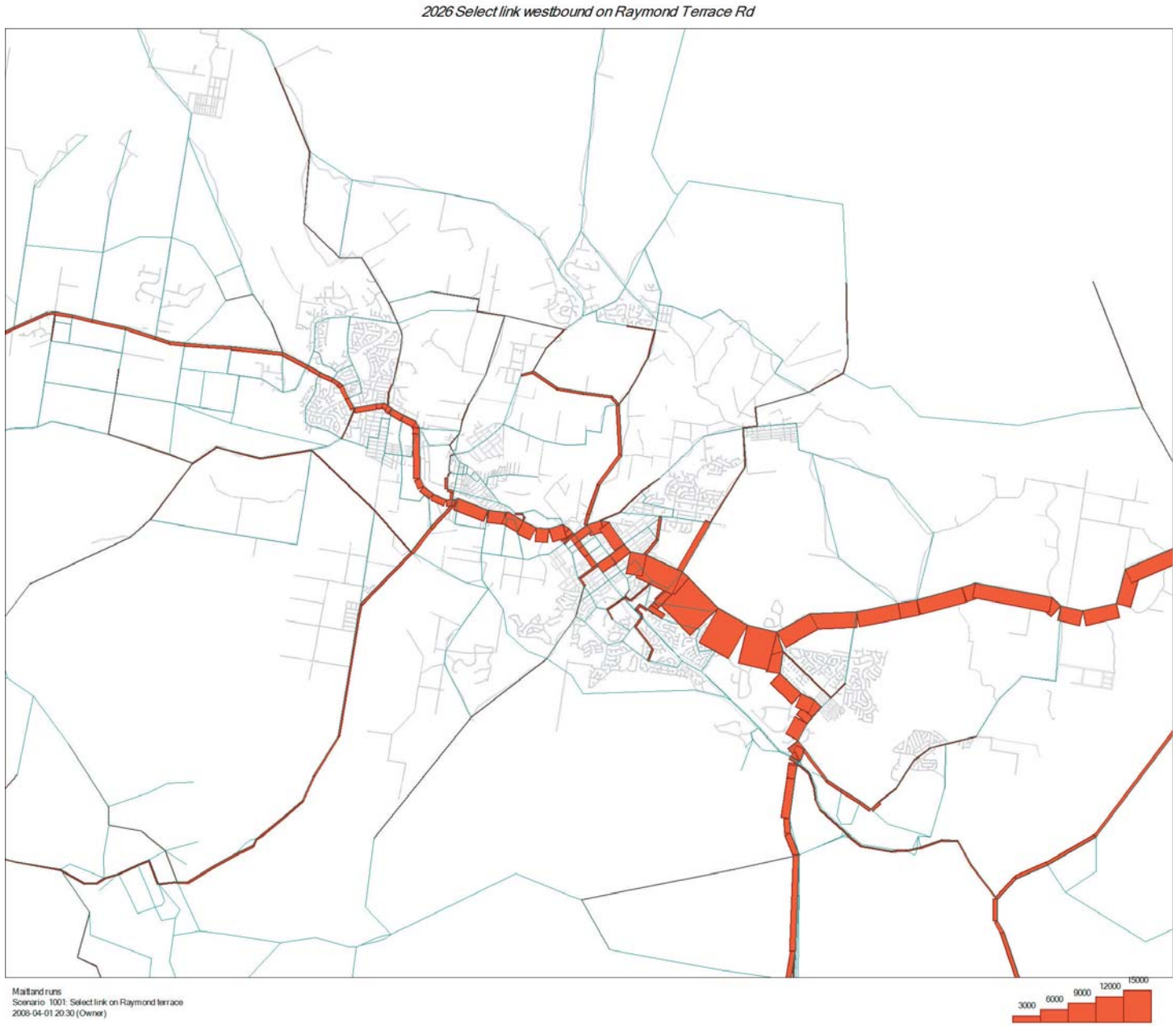


FIGURE A4.5B - SELECT LINK: RAYMOND TERRACE ROAD

FIGURE A4.5C - SELECT LINK: PROPOSED SOUTHERN BYPASS

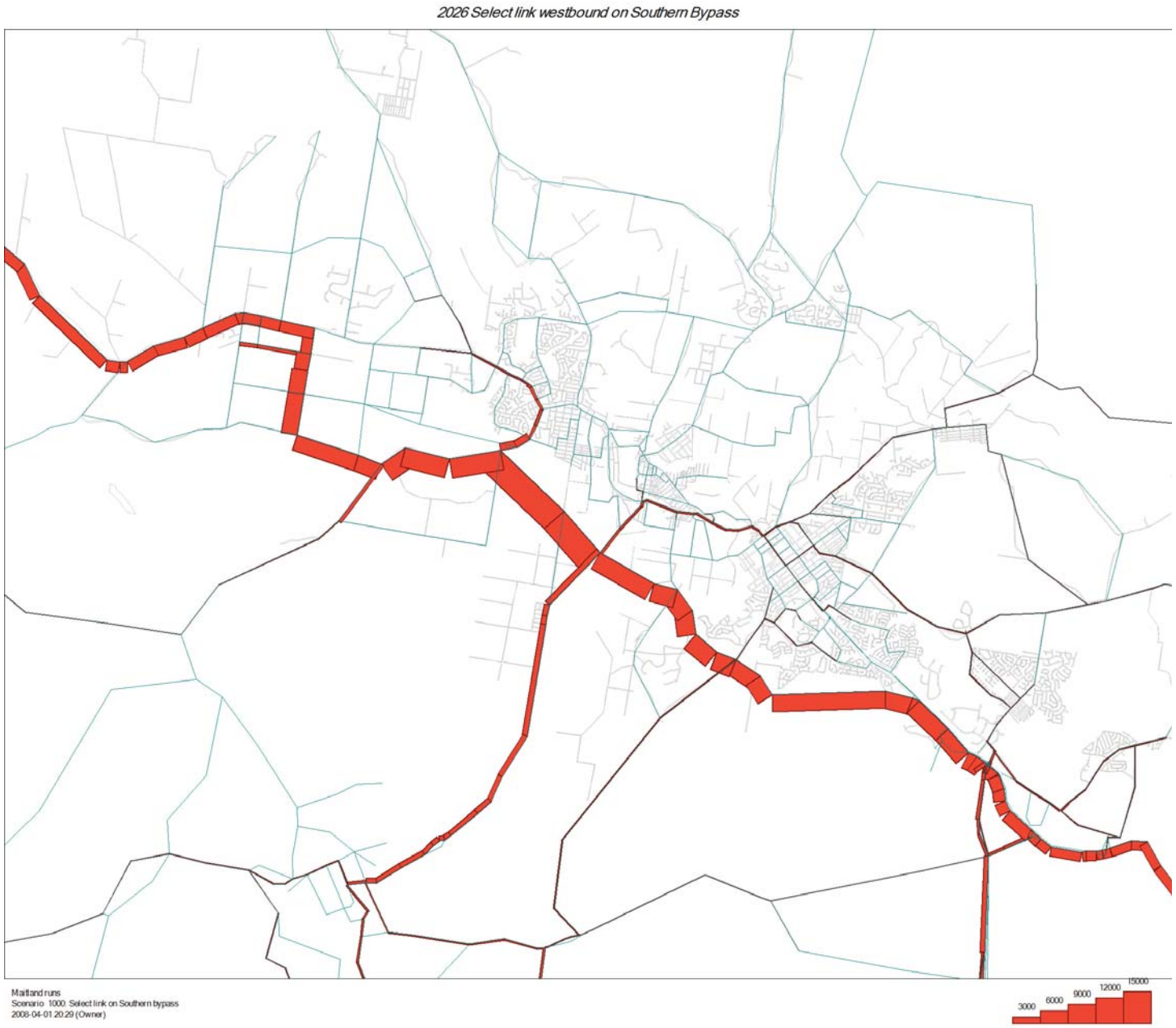


TABLE A.1A - TRAFFIC MODELLING RESULTS - TRAFFIC VOLUMES

Table A1A -Traffic Modelling Results - Traffic Volumes (vpd) - Includes Fourth River Crossing

Street	2006	2016	2016 + Infra (No HE)	2026	2026 + Infra	2026 + HE	2026 + HE + Infra
NEW ENGLAND HIGHWAY (NEH) (SH9)							
W. of Weakleys Dr	29,500	48,600	50,700	48,400	51,500	38,300	39,800
E. of Mitchell Dr	44,200	61,100	48,400	59,800	47,300	47,900	44,500
W. of Mitchell Dr	43,900	60,200	47,800	58,200	45,800	46,800	43,400
W. of Melbourne St	43,700	56,600	50,700	58,500	50,100	51,600	46,400
W. of Cessnock Rd	41,600	57,800	42,900	61,400	49,800	52,500	45,000
E. of Aberglasslyn Rd	30,200	51,300	28,300	54,000	32,700	48,900	31,600
W. of Denton Park	18,500	30,100	19,800	34,400	26,800	27,800	25,800
W. of Anambah Rd	16,000	26,700	16,600	31,700	24,000	24,800	23,100
Thornton Rd N of SH9	10,700	26,300	25,700	40,100	39,700	34,300	34,500
Raymond Terrace Rd (MR104)							
E. of Metford Rd	13,300	29,100	29,000	33,100	33,300	29,700	29,700
W. of Metford Rd	7,900	17,600	17,600	21,100	22,000	18,600	18,800
Metford Rd							
N. of Raymond Terrace Rd	4,600	9,900	9,600	8,000	7,400	7,600	7,400
S. of Raymond Terrace Rd	3,900	5,600	5,500	10,200	9,800	8,600	8,500
Morpeth Rd (MR102) N. of Cumberland St	10,300	13,700	14,100	16,100	17,000	16,800	16,700
Melbourne St (MR102) N. of NEH	10,200	22,500	21,400	26,000	27,800	19,600	25,100
Belmore Rd (MR101) (at the bridge)	11,700	18,900	5,000	19,000	5,500	19,800	6,600
Cessnock Rd (MR195) (S. of SH9)	8,500	19,200	15,600	22,200	20,000	28,800	23,000
Aberglasslyn Rd N. of SH9	7,000	13,200	10,300	14,000	10,700	14,400	10,800
Wollombi Rd under the rail line	2,700	3,700	7,300	7,000	8,500	3,800	8,800

Existing Network Model includes Fourth River Crossing

HE = Hunter Expressway

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TRANSPORT MODELLING RESULTS
ADDITIONAL MODELLING INFORMATION FOR ROAD NETWORK SCENARIOS
WITHOUT FOURTH RIVER CROSSING

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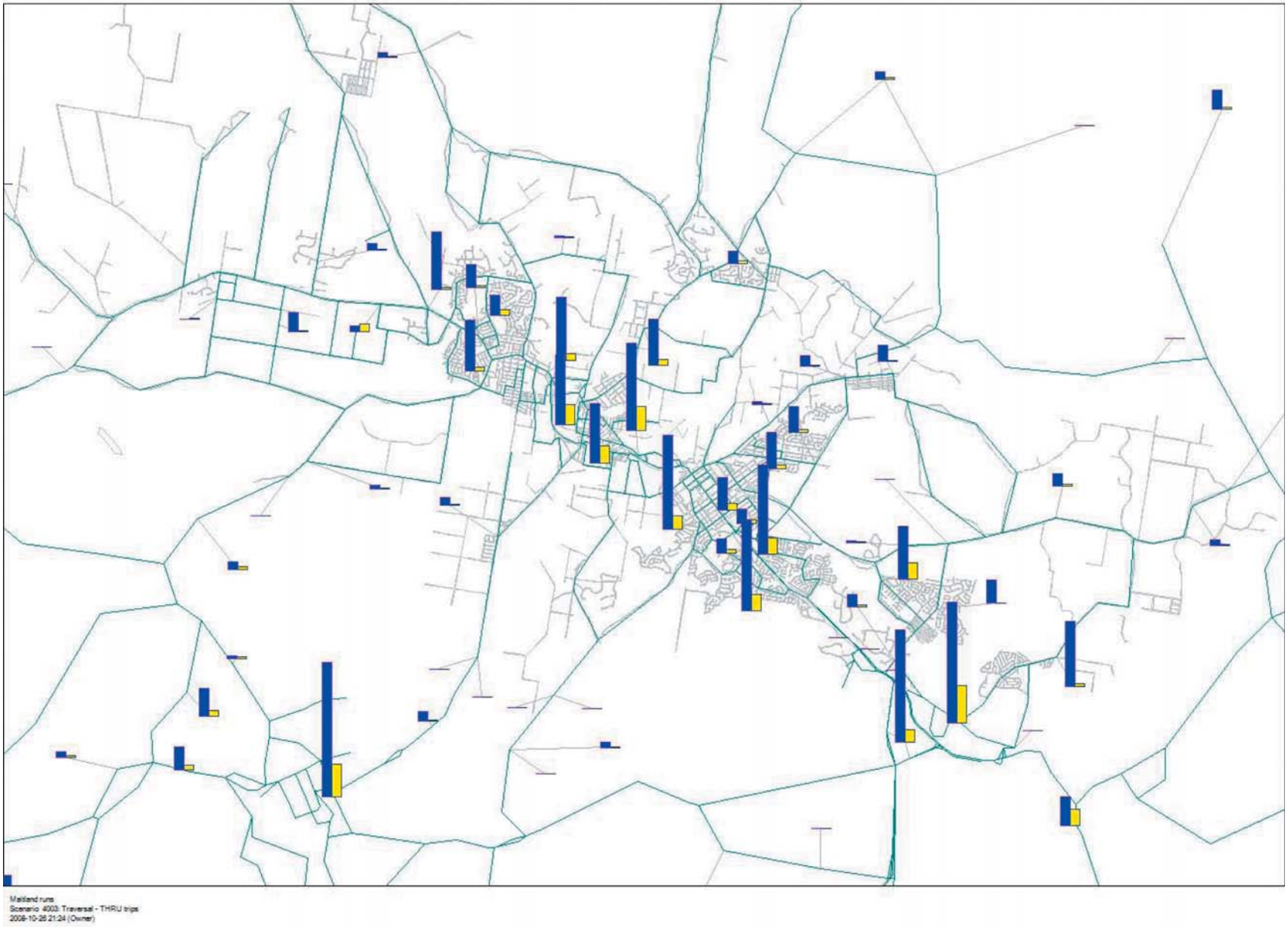
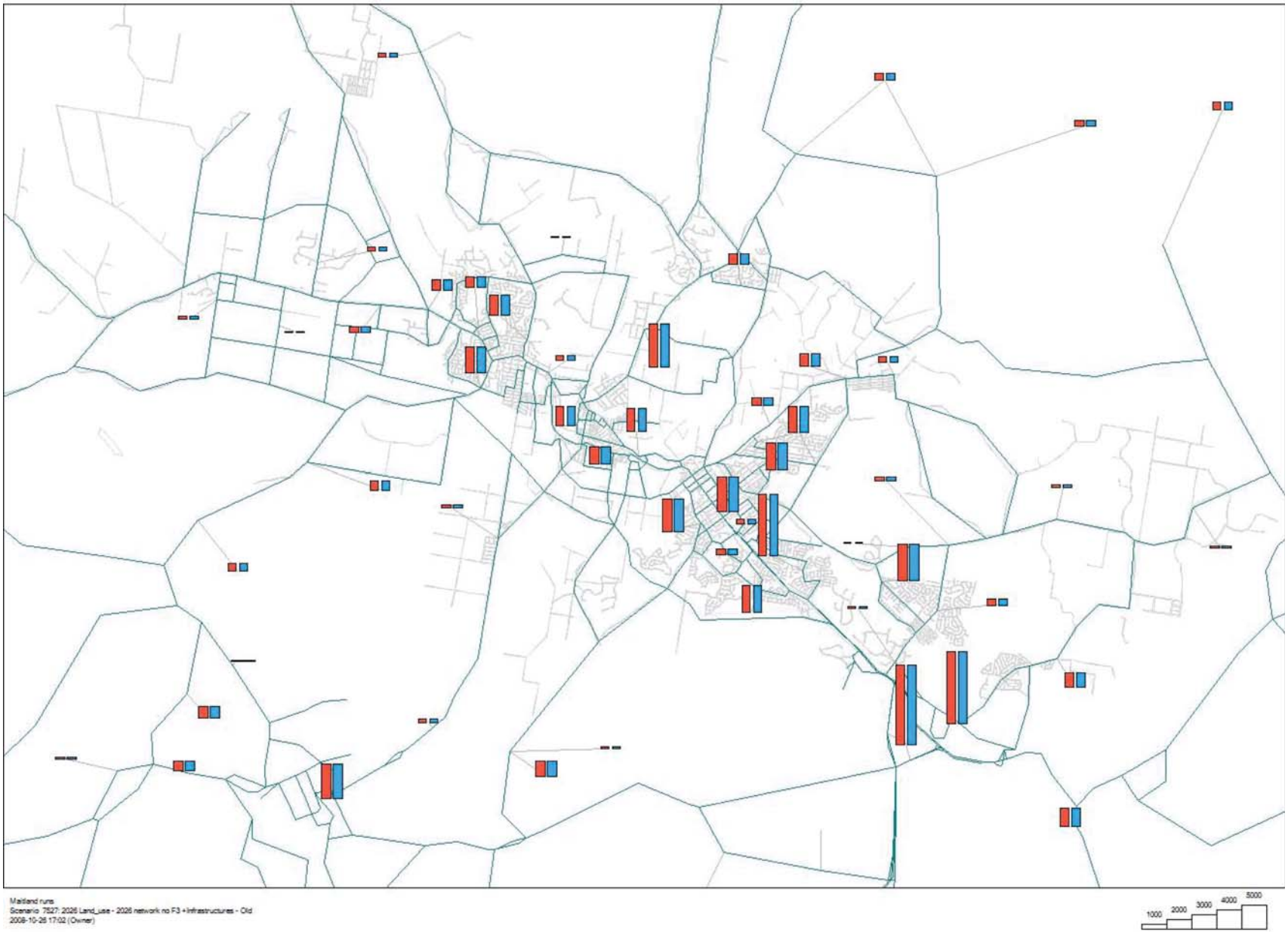
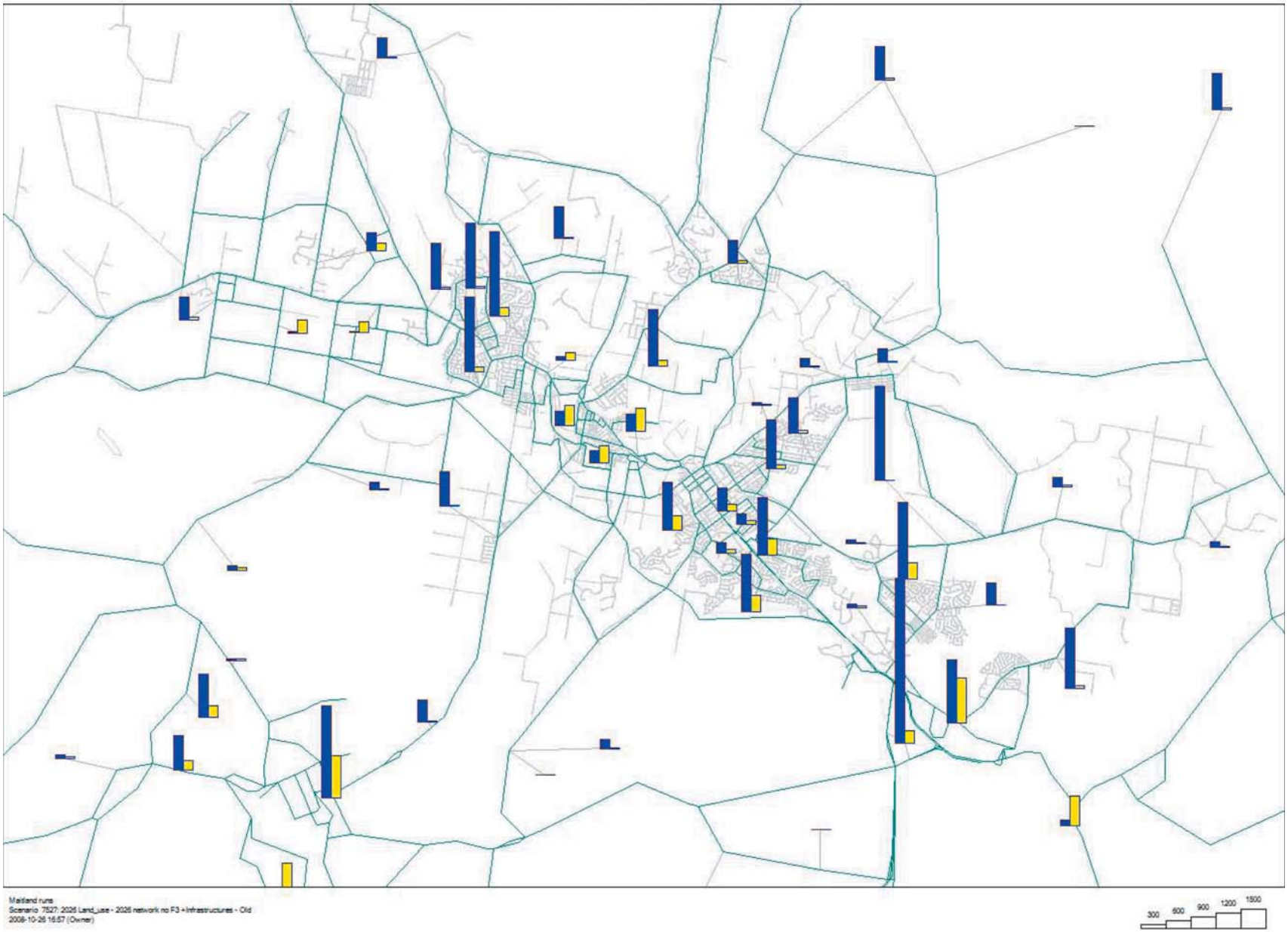
2006 Population (blue pyramid) and Employment (yellow Pyramid)



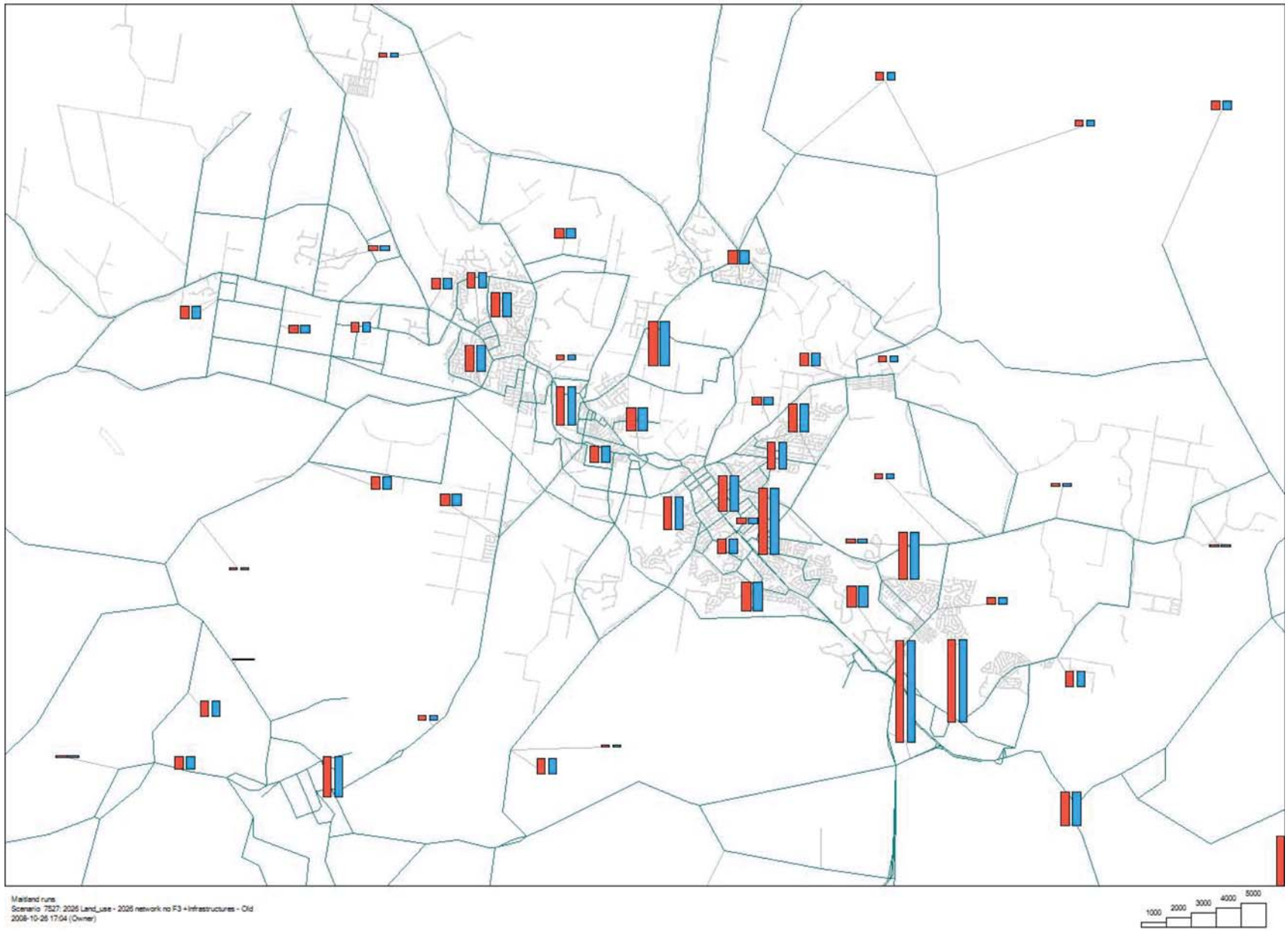
2006 Trip productions and Attractions



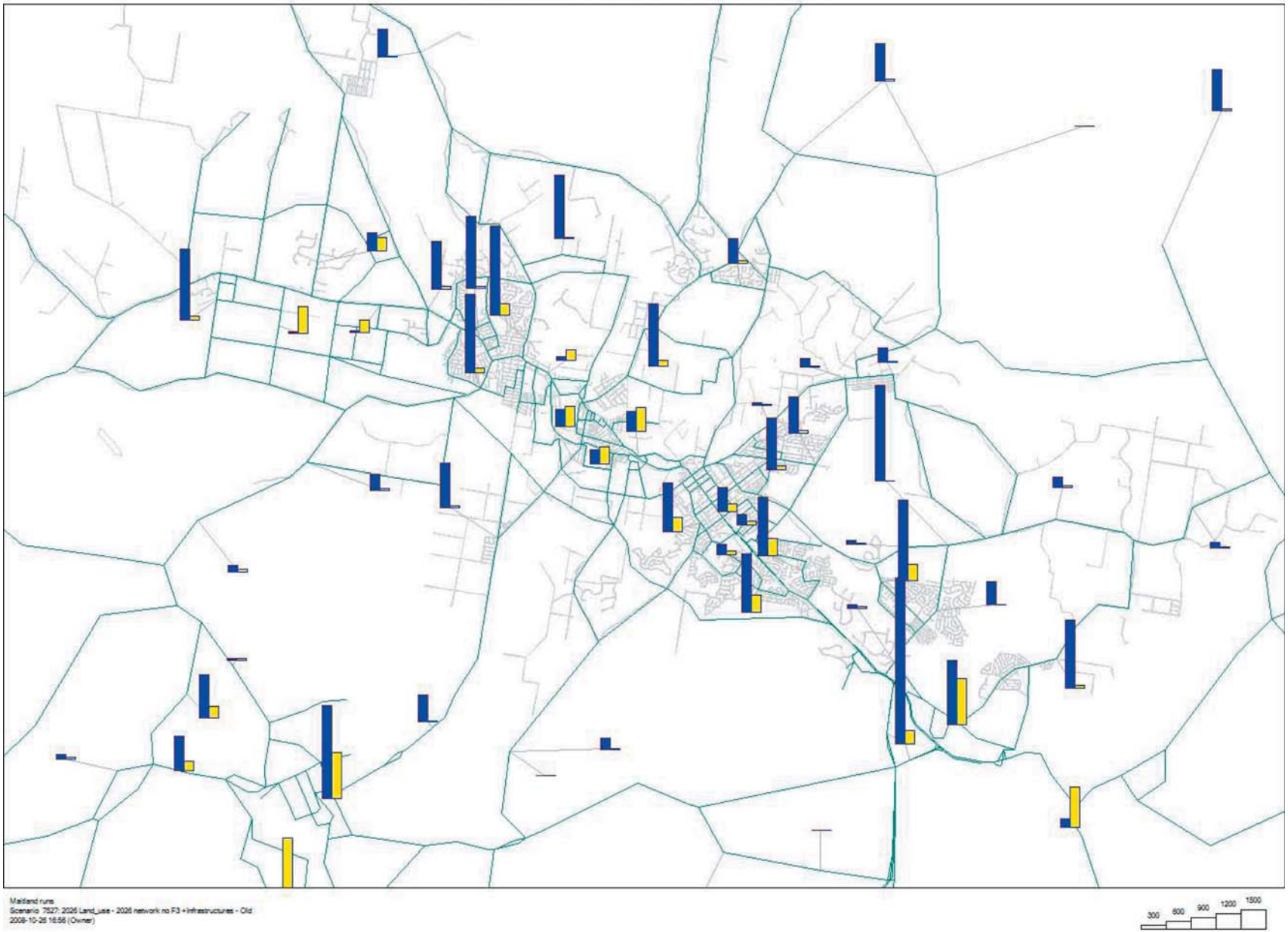
2016 Population (blue pyramid) and Employment (yellow pyramid



2016 Trip productions and Attractions

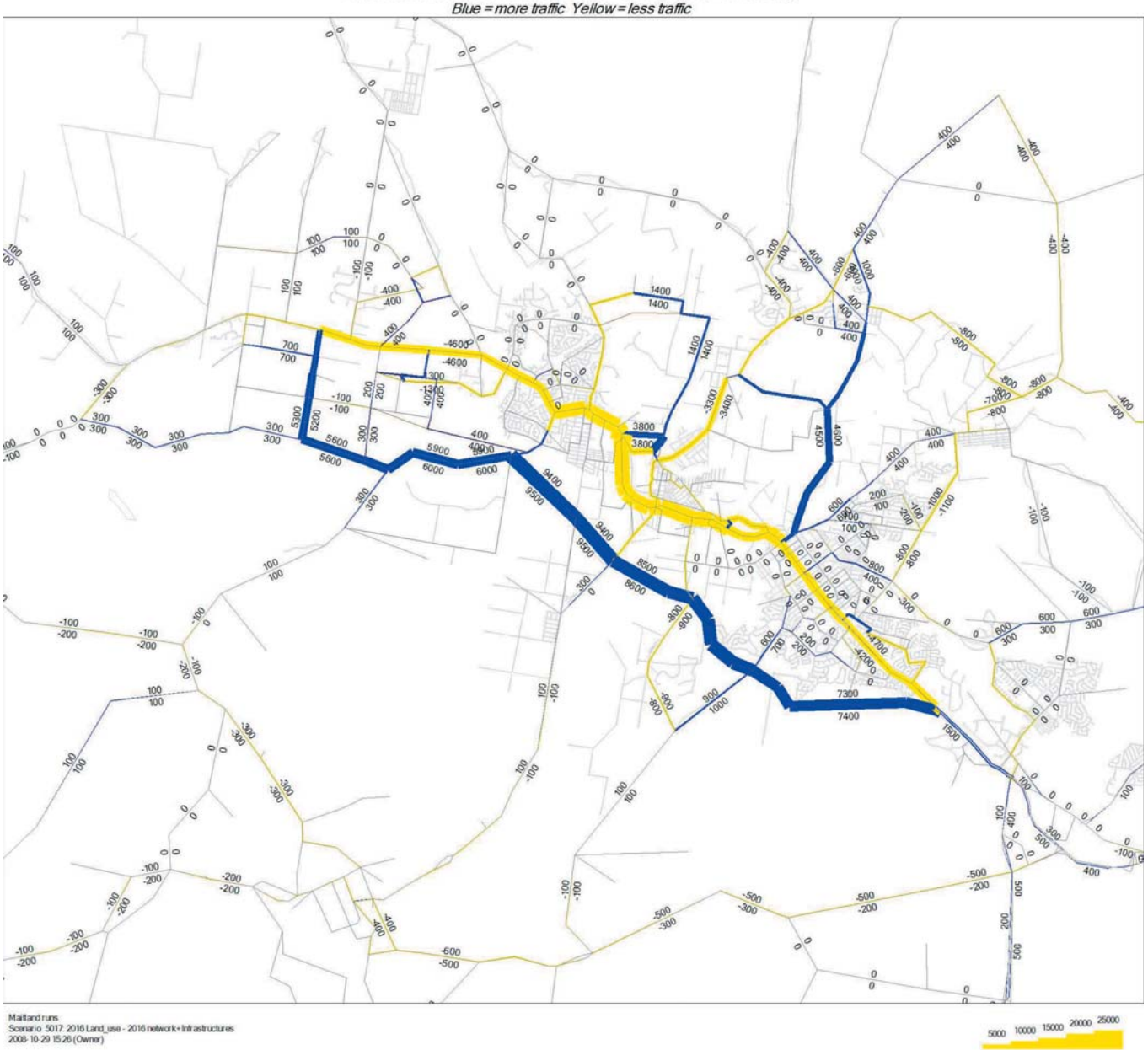


2026 Population (blue pyramid) and Employment (yellow pyramid

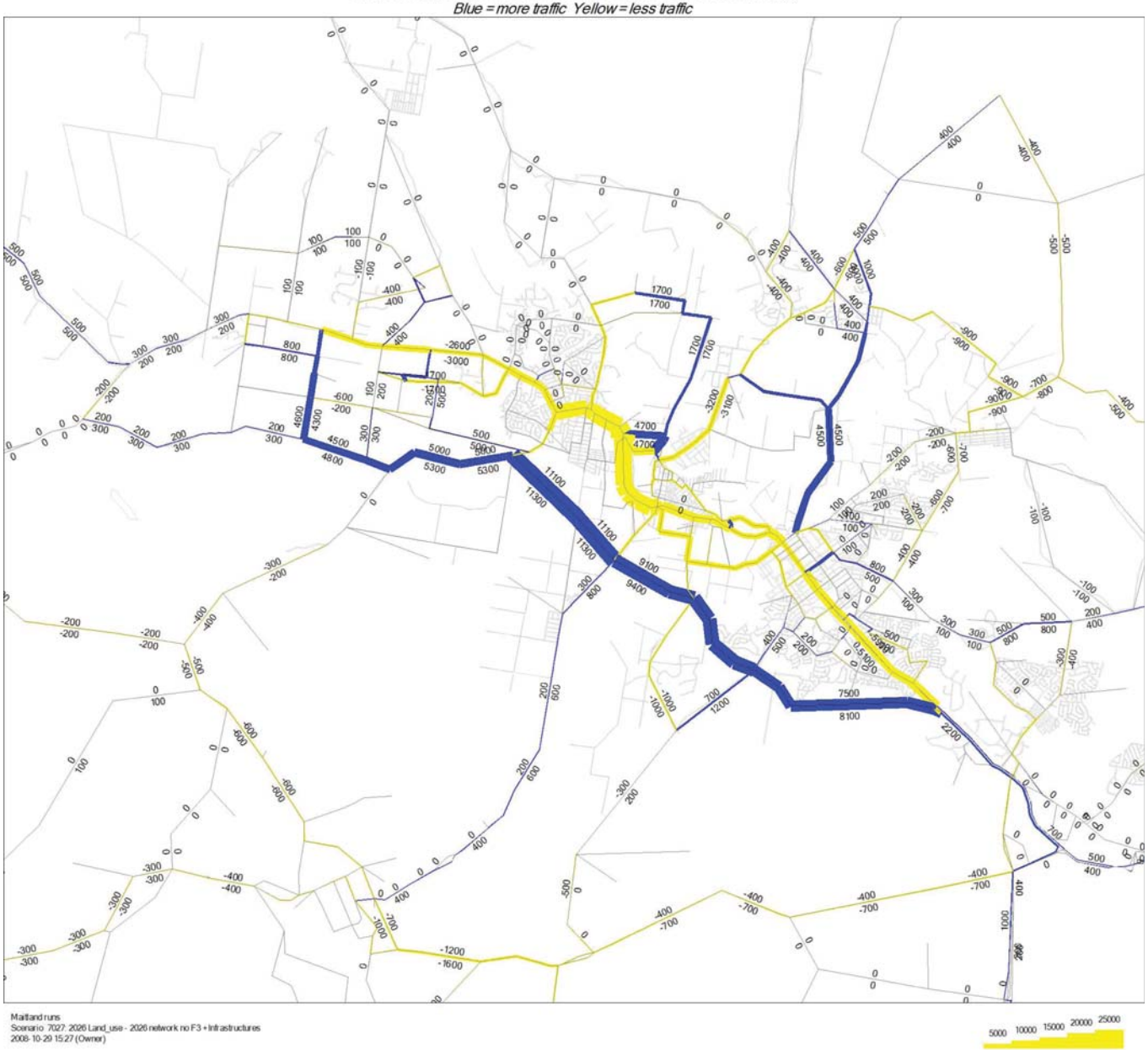


2026 Trip productions and Attractions

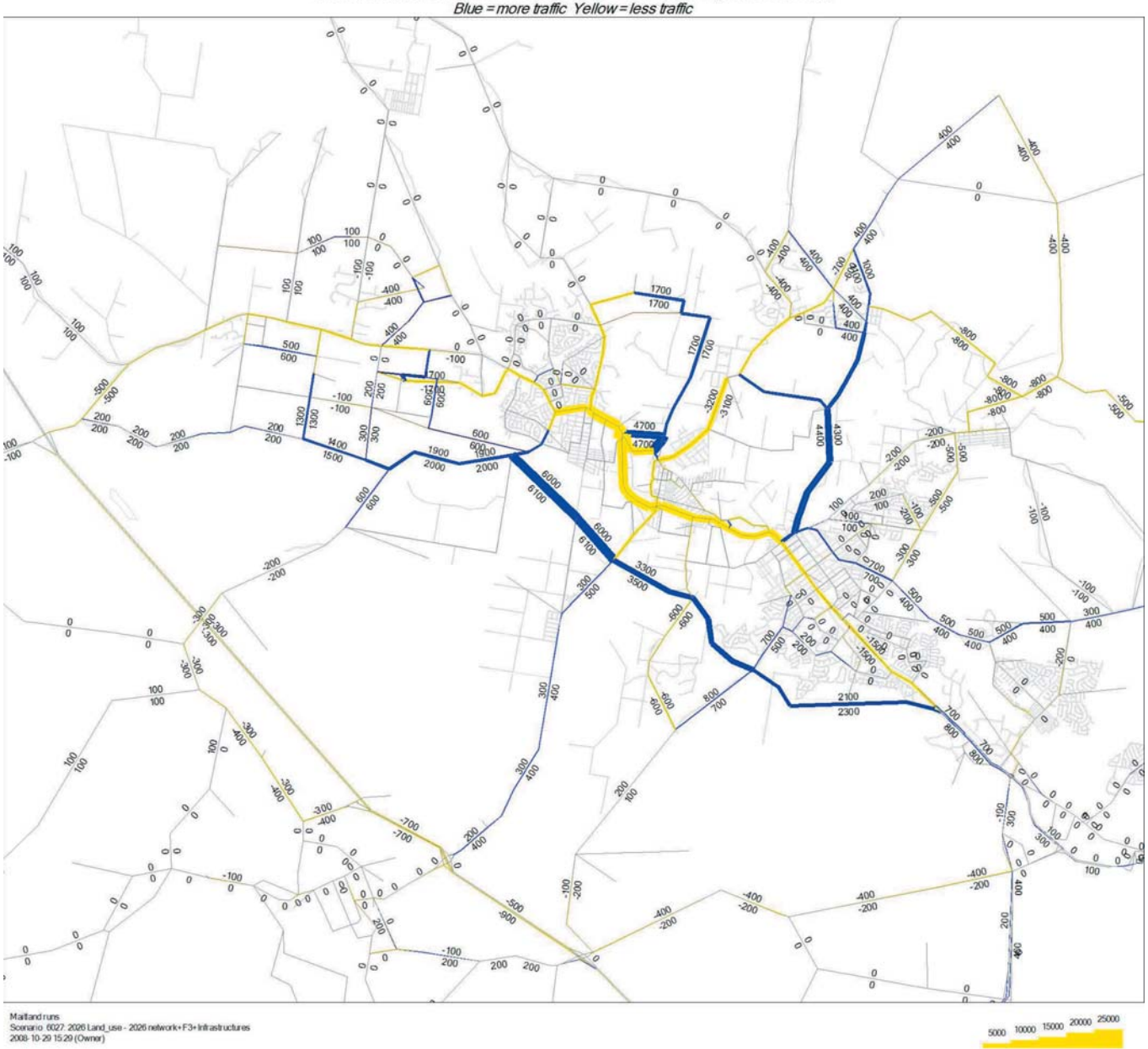
Difference in modelled AWT flows 2016 Preferred Option - Do Nothing
Blue = more traffic Yellow = less traffic



Difference in modelled AWT flows 2026 Preferred Option - Do Nothing
Blue = more traffic Yellow = less traffic

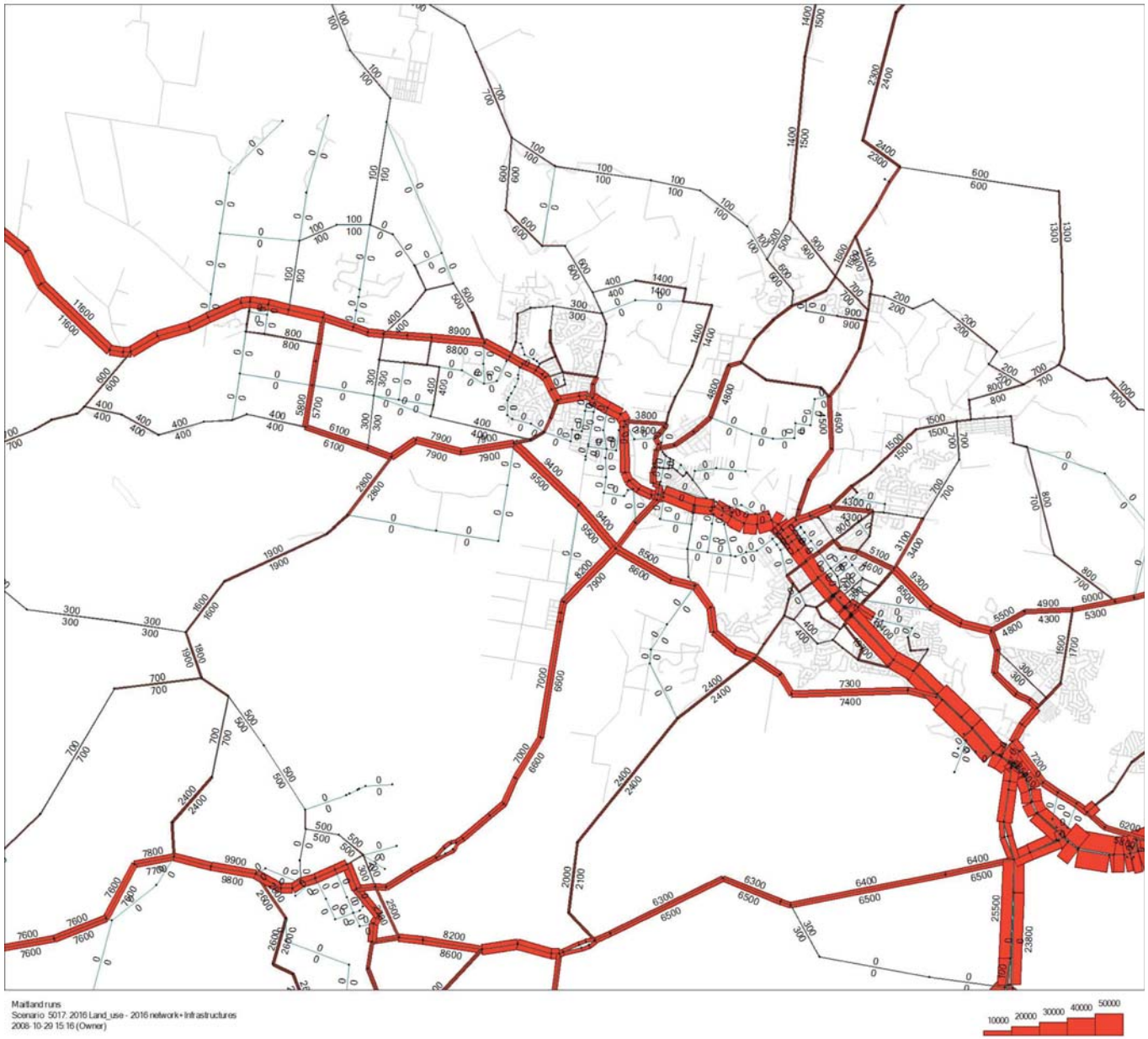


Difference in modelled AWT flows F3 network 2026 Preferred Option - Do Nothing
Blue = more traffic Yellow = less traffic

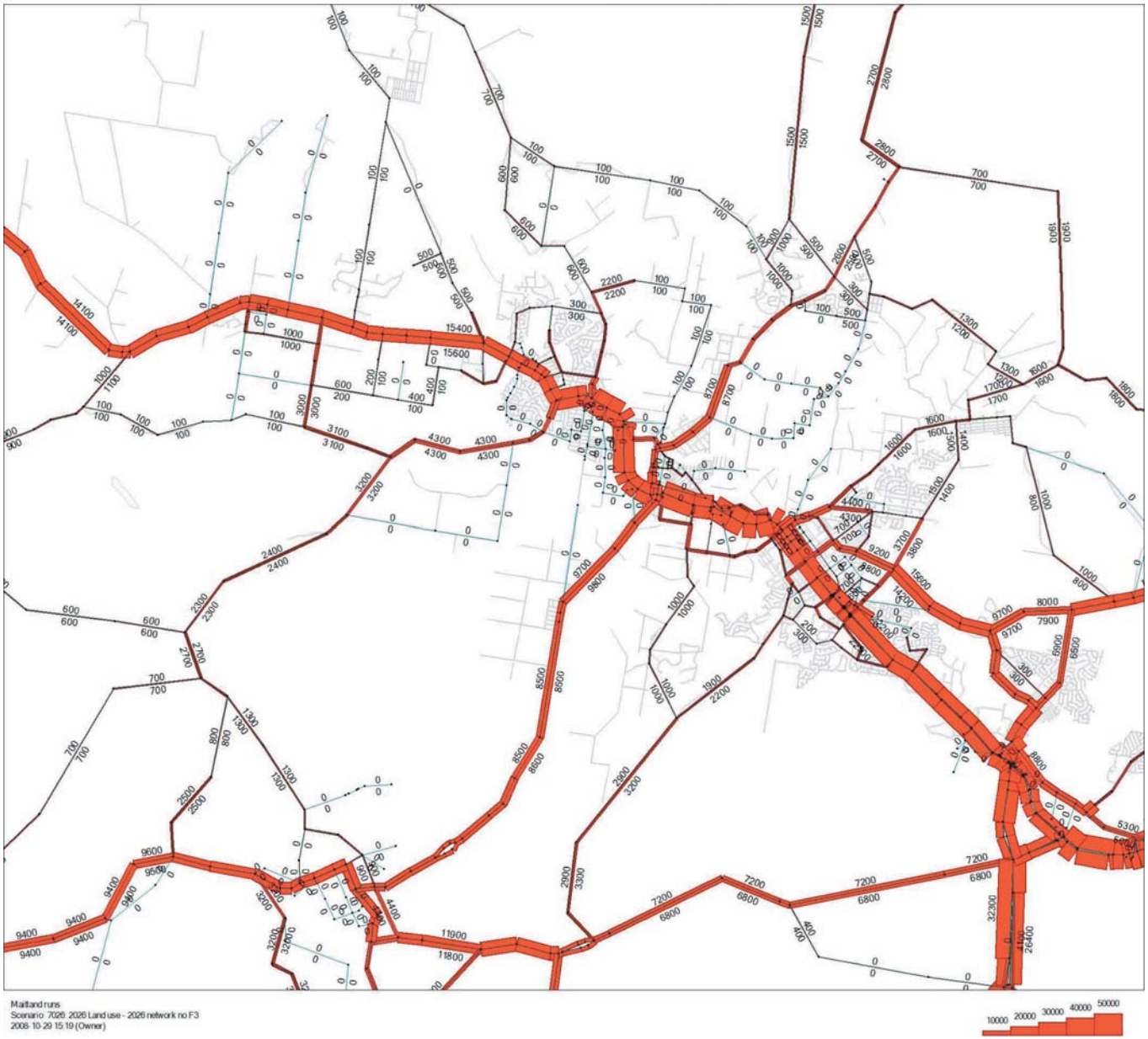


Modelled ADT 2016 land use 2016 network - Do Nothing Option

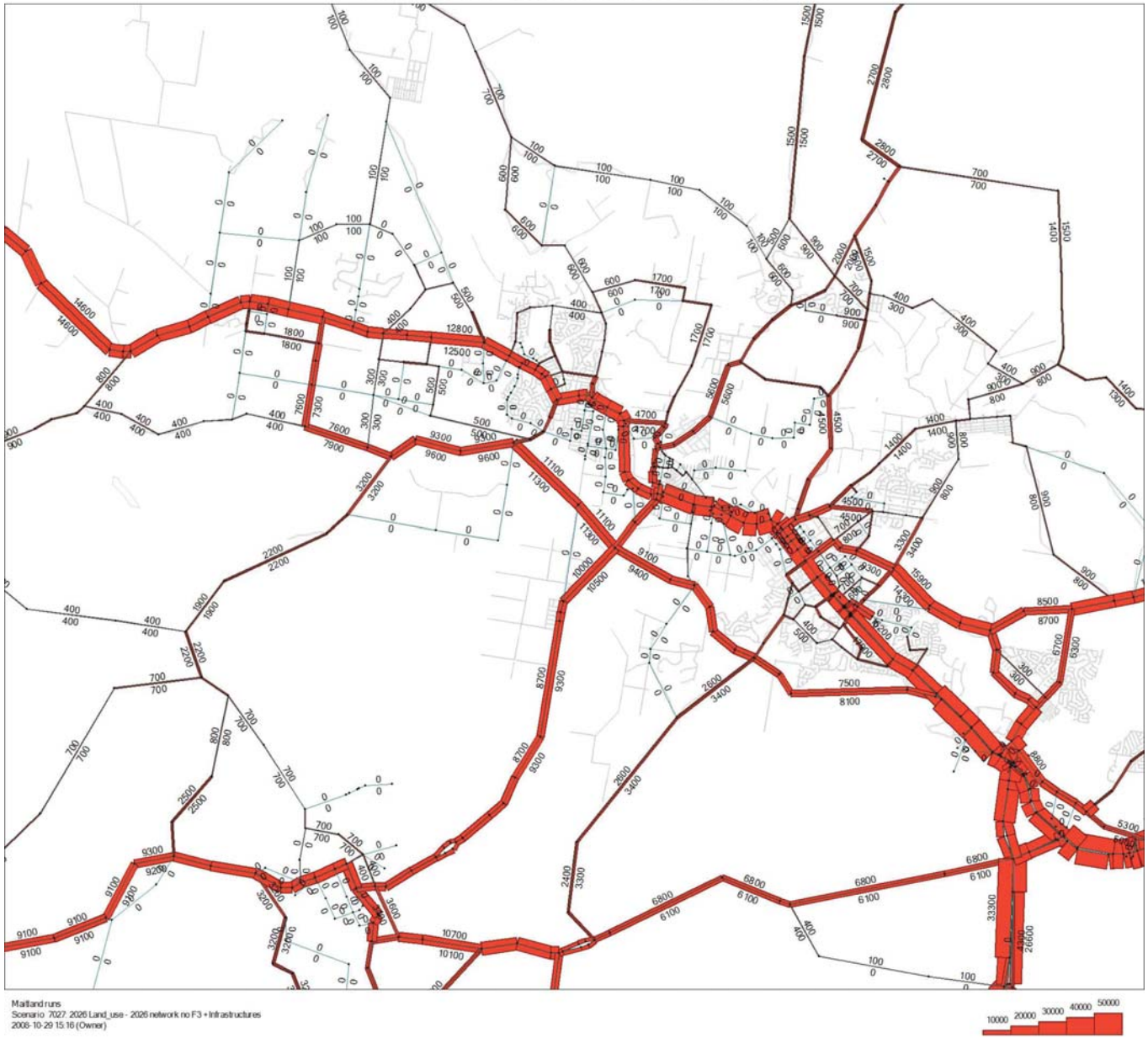
Modelled ADT 2016 land use 2016 network - Infrastructure Option



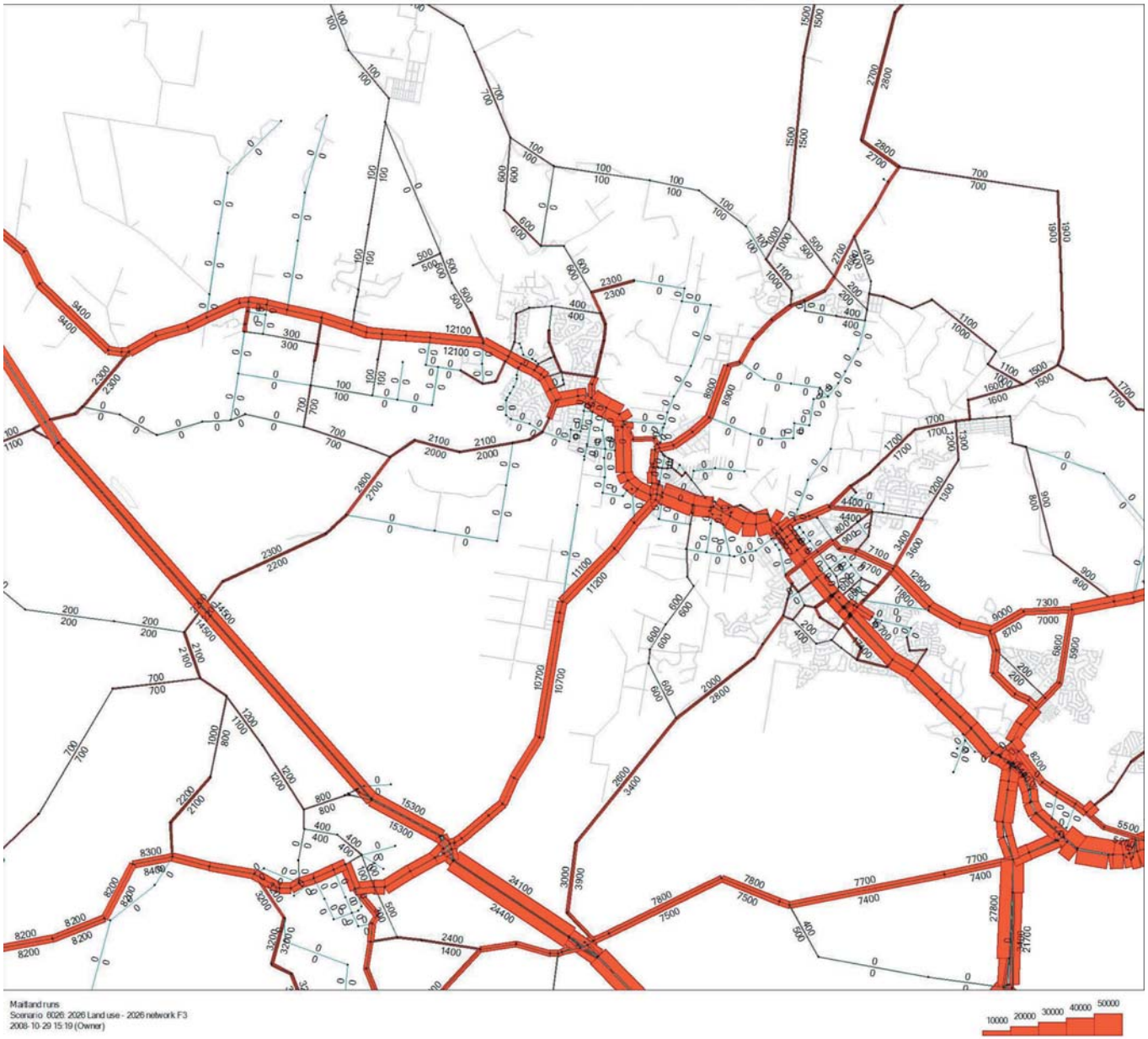
Modelled ADT 2026 land use 2026 network - Do Nothing Option



Modelled ADT 2026 land use 2026 network - Infrastructure Option



Modelled ADT 2026 land use 2026 F3 network - Do Nothing Option



Modelled ADT 2026 land use 2026 F3 network - Infrastructure Option

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